BREASTFEEDING INTERVENTIONS IN KANSAS: AN EXPLORATION OF MOTHERS' BREASTFEEDING PRACTICES, VIEWS, AND PERCEIVED BARRIERS

A Dissertation by

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DEDICATION

To my loving husband Ron,
my son Taylor, my daughter Gianna, my son William,
my family and friends

ACKNOWLEDGMENTS

I would like to thank my advisor, Charles Burdsal, for his thoughtful guidance and support over the years. Thanks also go out to Ruth Wetta for her continued support. Both have contributed greatly to my professional development. I would also like to extend my gratitude to the members of my committee: Paul Ackerman, Darwin Dorr, Mark Glaser, and Rhonda Lewis for their helpful ideas, comments, and suggestions on this project. I also want to thank the representatives of all public health departments in Kansas that participated in this project and who continue to devote great time and effort to making communities better places to live and work. Last, I want to thank the chair, faculty and staff at the Department of Preventive Medicine and Public Health with the University of Kansas School of Medicine – Wichita for their continued support and encouragement.

ABSTRACT

The American Academy of Pediatrics recommends exclusive breastfeeding for the first six months of an infant's life. In the United States, about three quarters of women start breastfeeding in the early post-partum period and less than half are still breastfeeding their infant at six months of age. The purpose of this study was to examine the influence of breastfeeding interventions on breastfeeding rates in Kansas.

Fifteen public health departments agreed to participate in this research. Women who had a live birth between July 1, 2010, and April 30, 2012, were eligible to participate. The Breastfeeding Initiative Evaluation Survey was designed and consisted of selected items from the Pregnancy Risk Assessment Monitoring System survey and additional items to investigate program impact.

Two multiple regression analyses were conducted to assess predictors related to length of breastfeeding. One used demographics and the other used types of breastfeeding services as predictors of breastfeeding duration. The linear combination of demographic predictor variables was significantly related to duration, $F(5,112) = 30.41$, $p < 0.01$, $R^2 = 0.59$, adjusted $R^2 = 0.57$. The linear combination of types of service predictor variables was also significantly related to duration, $F(6,77) = 6.82$, $p < 0.01$, $R^2 = 0.37$, adjusted $R^2 = 0.31$.

From a public health perspective, it is important that infants are exclusively breastfed for the first six months of life. This study demonstrates that the introduction of other liquids and solid food negatively influences breastfeeding duration. Additionally, the services from a breastfeeding educator and availability of breastfeeding equipment are critical in the success of breastfeeding interventions. This study's findings can be used to enhance breastfeeding services and their delivery.

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CHAPTER 1

BACKGROUND

The short- and long-term health benefits of breastfeeding for mother and infant are well documented (American Academy of Pediatrics, 2005, 2012; Horta, Bahl, Martines, & Victora, 2007; Ip, Chung, Raman, Chew, Magula, DeVine, Trikalinos, & Lau, 2007). The American Academy of Pediatrics (2005, 2012) along with the American College of Obstetricians and Gynecologists (2000) and the American Dietetic Association (2009) recommend exclusive breastfeeding for the first six months of an infant's life followed by continued breastfeeding while introducing complementary foods until an infant is one year of age or longer as mutually desired by mother and infant. Despite demonstrated health benefits of breastfeeding, initiation and duration rates of breastfeeding remain low. The Centers for Disease Control and Prevention (2012) reports that about three quarters of women in the United States start breastfeeding in the early post-partum period and less than half are still breastfeeding their infant at six months of age. Through a multi-faceted approach, the primary goal of breastfeeding interventions is to promote breastfeeding. The purpose of this study is to examine the influence of breastfeeding support programs on breastfeeding rates in Kansas communities. It is hypothesized that participation in a local public health department's breastfeeding support program influences breastfeeding. Specifically, this study examines the social determinants of breastfeeding, breastfeeding practices, mothers' views of breastfeeding, and mothers' perceived barriers toward breastfeeding. To our knowledge, no study has investigated the impact of breastfeeding interventions in Kansas.

Benefits of Breastfeeding

The overall benefits of breastfeeding extend far beyond the immediate ones for mother and infant. There are significant long-term health benefits as well as economic benefits associated with breastfeeding.

First, the immediate health benefits of breastfeeding are well documented (AAP, 2005, 2012). Breast milk is rich in nutrients and consists of the right combination of sugar, water, and protein for infant development. Human milk provides infants protection from infectious disease during the first year of life (Duits, Jaddoe, Hofman, & Moll, 2010; Heinig, 2001; Ladomenou, Moschandreas, Kafatos, Tselentis, & Galanakis, 2010). Common infections from which infants are protected include bacterial meningitis (Cochi, Fleming, Hightower, Limpakarnjanarat, Facklam, Smith, Sikes, & Broome, 1986; Hanson, 2007; Istre, Conner, Broome, Hightower, & Hopkins, 1985), otitis media (Abrahams & Labbok, 2011; Duncan, Ey, Holberg, Wright, Martinez, & Taussig, 1993; Sabirov, Casey, Murphy, & Pichichero, 2009), diarrhea (Howie, Forsyth, Ogston, Clark, & Florey, 1990; Lopez-Alarcon, Villalpando, & Fajardo, 1997), gastroenteritis (Duits et al., 2010; Morales, Garcia-Esteban, Guxens, Guerra, Mendez, Molto-Puigmarti, Lopez-Sabater, & Sunyer, 2012; Plenge-Bonig, Soto-Ramirez, Karmaus, Petersen, Davis, & Forster, 2010), and respiratory tract infection (Duits et al., 2010; Oddy, Sly, de Klerk, Landau, Kendall, Holt & Stanley, 2003). The Agency for Healthcare Research and Quality (AHRQ) reports significant health risks associated with formula feeding or early weaning of breastfeeding. For example, the risk of acute ear infections is 100 percent higher for exclusively formula-fed infants than for infants who were exclusively breastfed for the first six months of life (Ip et al., 2007). Also, the risk of hospitalization for lower respiratory tract disease during the first year of life is

more than 250 percent higher for formula-fed infants than for those who were breastfed for four months (Bachrach, Schwarz, & Bachrach, 2003).

Breastfeeding has also been associated with long-term health outcomes for young children such as a decreased incidence of neonatal mortality (Huffman, Zehner, & Victora, 2001), sudden infant death syndrome (Ford, Taylor, Mitchell, Enright, Stewart, Becroft, Scragg, Hassall, Barry, Allen, et al., 1993; McVea, Turner, & Peppler, 2000), and type 2 diabetes (Horta et al., 2007; Gerstein, 1994). In particular, Owen and colleagues report that there is a 64 percent higher risk of type 2 diabetes for children who were formula-fed (Owen, Martin, Whincup, Davey Smith, & Cook, 2006). Other long-term health outcomes include protection from chronic disease (e.g., asthma, allergies), lower mean blood pressure, and lower total cholesterol (Horta et al., 2007). Once more, the AHRQ reports that formula feeding is associated with a 67 percent higher risk for asthma with family history and a 35 percent higher risk for asthma with no family history (Ip et al., 2007).

Moreover, breastfeeding serves as a protective factor against childhood obesity (Arenz, Ruckerl, Koletzko, & Von Kries, 2004; Grummer-Strawn & Mei, 2004; Harder, Bergmann, Kallischnigg, & Plagemann, 2005; Horta et al., 2007; Li, Fein, & Grummer-Strawn, 2008; Owen, Martin, Whincup, Davey Smith, & Cook, 2005). Approximately 17% of children in the United States between the ages of 2 and 19 are obese (body mass index (BMI) > 95% for age and gender) and nearly 34% are overweight (BMI 85-94% for age and gender) (Centers for Disease Control and Prevention [CDC], 2012; Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006). Obesity contributes to a wide range of physical and emotional problems including high blood pressure, type 2 diabetes, and psychosocial problems (Goran, Ball, & Cruz, 2003; Mokdad, Ford, Bowman, Dietz, Vinicor, Bales, &

Marks, 2003; Must, Spadano, Coakley, Field, Colditz, G., & Dietz, 1999). Childhood obesity is also associated with higher health care costs. Elevated BMI in childhood is associated with $14.1 billion in additional prescription drug, emergency room, and outpatient visit costs annually (Trasande, & Chatterjee, 2009; Trasande, Liu, Fryer, & Weitzman, 2009). Further, research findings show that the likelihood to become obese as an adult is higher for children who have been bottle-fed rather than breastfed (Arenz et al., 2004; Harder et al., 2005; Owen et al., 2005; Singhal & Lanigan, 2006).

Furthermore, health benefits of breastfeeding practices extend to mothers as well. Breastfeeding is linked to a reduced risk of breast cancer (Bernier, Plu-Bureau, Bossard, Ayzac, & Thalabard, 2000), ovarian cancer (Danforth, Tworoger, Hecht, Rosner, Colditz, & Hankinson, 2007; Jordan, Cushing-Haugen, Wicklund, Doherty, & Rossing, 2012), and type 2 diabetes (Bimla Schwarz, Brown, Creasman, Stuebe, McClure, Van Den Eeden, & Thom, 2010; Stuebe, Rich-Edwards, Willett, Manson, & Michels, 2005). Recent evidence suggests that breastfeeding may also be associated with a reduced incidence of post-partum depression (Hamdan & Tamim, 2012; Tashakori, Zamani Behbahani, & Davasaz Irani, 2012). Other observable benefits of breastfeeding for mothers include ease of food preparation by not having to prepare daily infant formula, time savings, dollar savings on infant formula, and enhanced mother-infant bonding (U.S. Department of Health and Human Services, 2012).

Last, society greatly benefits from better breastfeeding practices. Bartick and Reinhold (2010) conducted a pediatric cost analysis of all pediatric diseases for which the Agency for Healthcare Research and Quality reported risk ratios favoring breastfeeding. In their study, the authors included the following pediatric illnesses: necrotizing enterocolitis,

otitis media, gastroenteritis, lower respiratory tract infections requiring hospitalization, atopic dermatitis, sudden infant death syndrome, childhood asthma, childhood leukemia, type 1 diabetes mellitus, and childhood obesity. They concluded that if 90% of families in the United States would comply with recommendations to exclusively breastfeed for six months, the U.S. would save $13 billion per year and prevent 911 infant deaths per year. Their figures included direct cost and indirect cost (e.g., wages that parents lose when caring for an ill child) for each disease as well as cost of premature death.

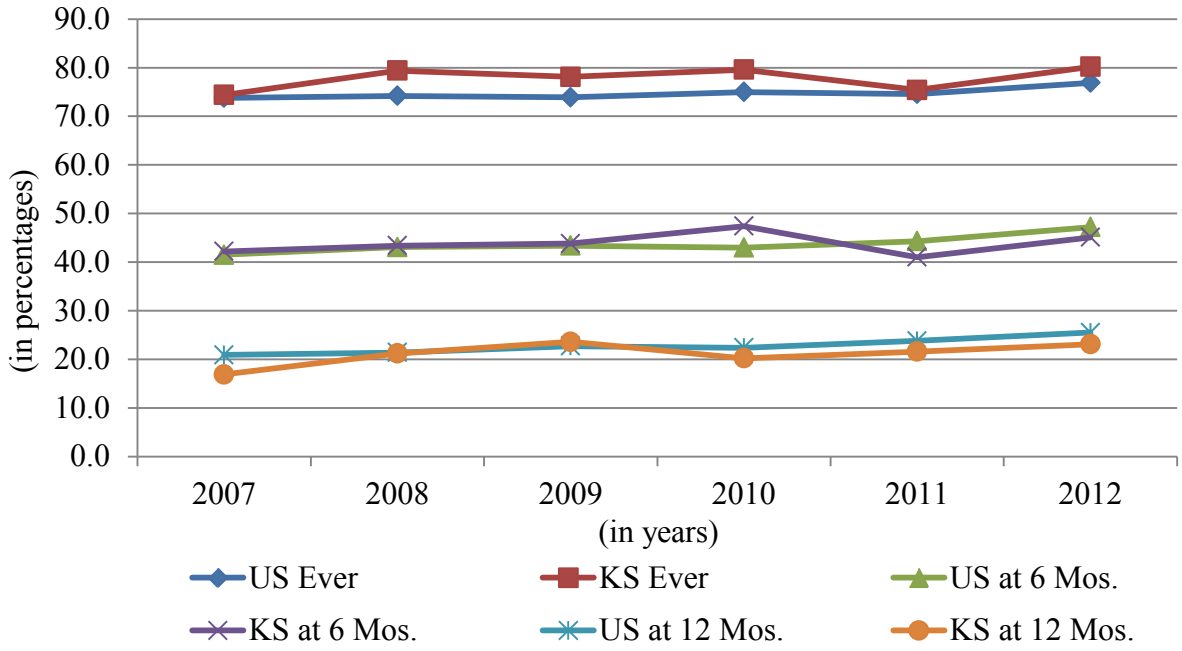
Given the demonstrated health and economic benefits associated with breastfeeding as well as the negative consequences of childhood obesity, it becomes important to explore the impact of breastfeeding support programs on initiation and duration rates of breastfeeding.

Breastfeeding Rates in Kansas and the United States

Healthy People 2020 is a guide produced by the U.S. Department of Health and Human Services in collaboration with other federal agencies, stakeholders, and the advisory committee (U.S. Department of Health and Human Services, 2010). It serves as a framework to monitor U.S. health measures and guides U.S. health policy by identifying areas of emphasis where action is needed to achieve better health in the United States by 2020. *Healthy People 2020* lists specific breastfeeding indicators to assist with efforts in increasing the initiation and duration rates of breastfeeding nationally. States and communities can use these measures as a basis of comparison to their own breastfeeding rates.

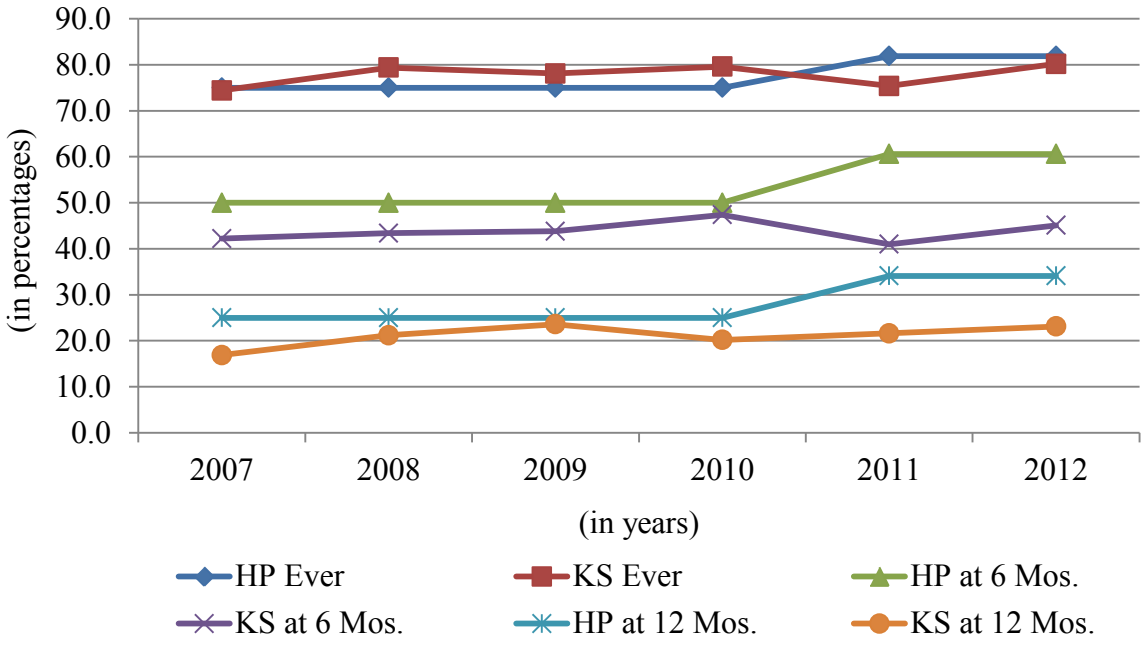
Breastfeeding is defined as an infant receiving predominantly breast milk as nutrition during the first year (CDC, 2013). *Healthy People 2020* objectives MICH-21.1 through 21.3

advocate to increase the proportion of mothers who breastfeed in the early postpartum period up to 81.9% (from 75.0% in *Healthy People 2010*), to 60.6% at 6 months (from 50.0%), and to 34.1% at 12 months (from 25.0%) (U.S. Department of Health and Human Services, 2000, 2010). Figures 1 and 2 illustrate a comparison of breastfeeding rates in Kansas versus the United States and Kansas versus *Healthy People 2010* and *2020* objectives.



Source: Centers for Disease Control and Prevention National Immunization Survey, 2004 - 2009 births

Figure 1. Breastfeeding Rates – Kansas versus United States



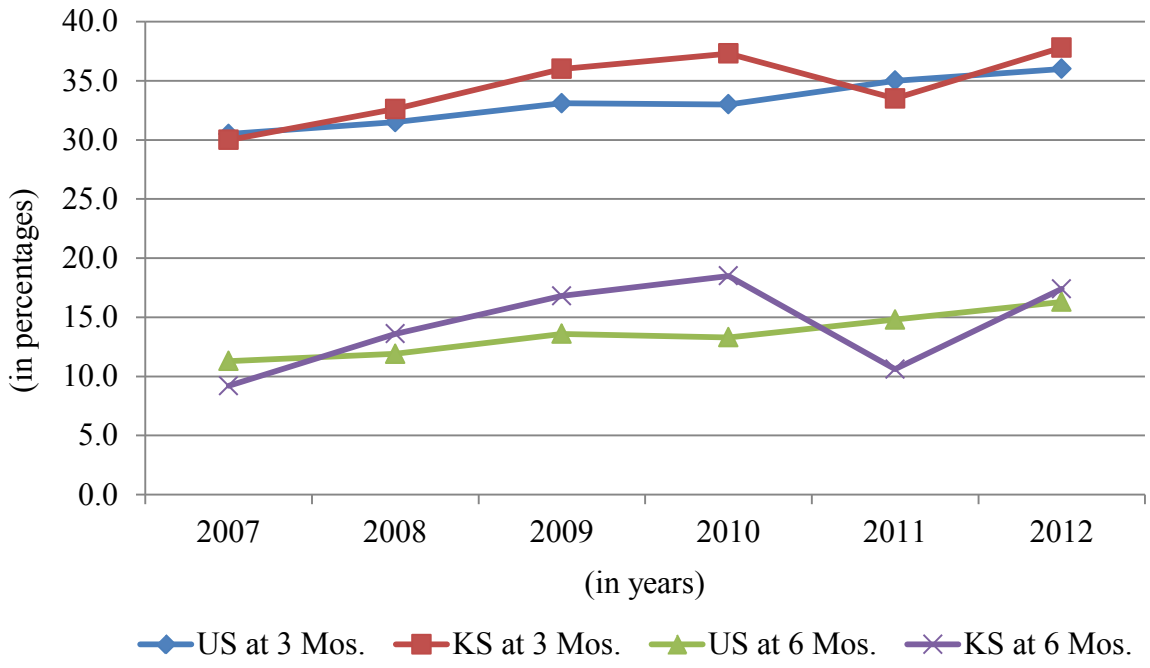
Source: Centers for Disease Control and Prevention National Immunization Survey, 2004 - 2009 births

Figure 2. Breastfeeding Rates – Kansas versus Healthy People

As demonstrated in Figure 1, Kansas has been above the national average with its breastfeeding initiation rate and, as shown in Figure 2, has nearly reached the *Healthy People 2020* objective. However, breastfeeding duration rates for Kansas and the United States decline dramatically at six months followed by twelve months (see Figure 1). When comparing Kansas rates with breastfeeding indicators proposed by *Healthy People 2010* (years 2007 through 2010) and *Healthy People 2020* (years 2011 and 2012), there is a gap between current breastfeeding rates at six and twelve months in Kansas and projected *Healthy People 2020* rates (see Figure 2).

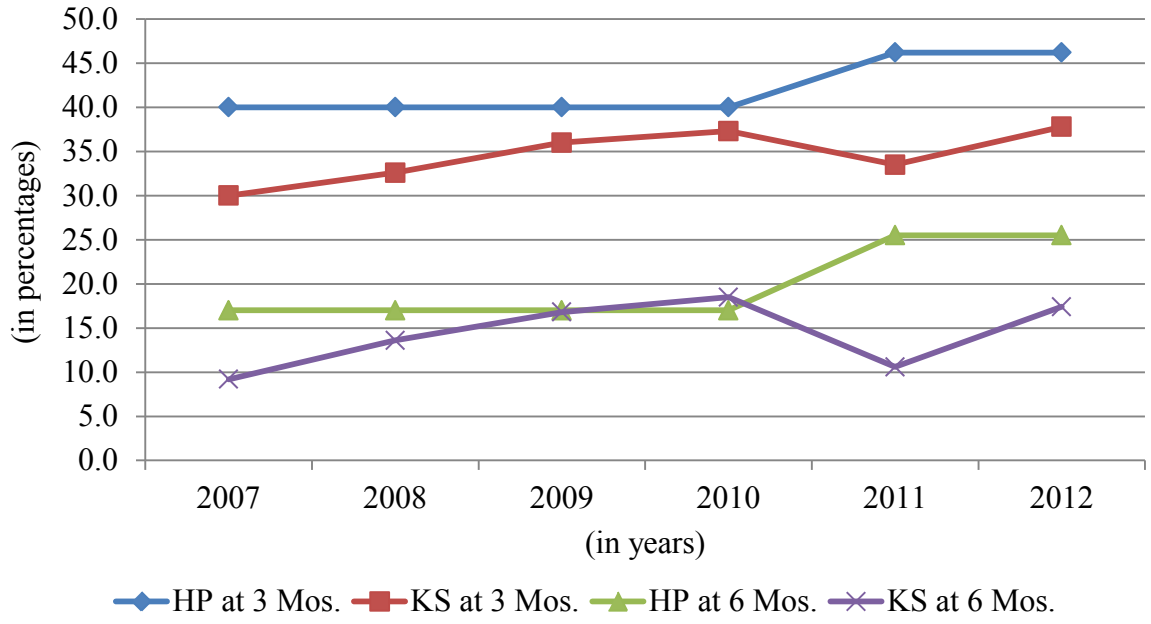
Exclusive breastfeeding is defined as an infant receiving no other nutrition besides breast milk during the first six months (CDC, 2013). *Healthy People 2020* objectives

MICH-21.4 and 21.5 propose to increase exclusive breastfeeding to 46.2% at 3 months (from 40.0%) and 25.5% at 6 months (from 17.0%). Figures 3 and 4 demonstrate exclusive breastfeeding rates for Kansas versus the United States and Kansas versus *Healthy People 2010* and *2020* objectives. Figure 3 shows a more optimistic picture for Kansas: exclusive breastfeeding rates at three and six months are a little higher for Kansas than for the rest of the country. Though, as demonstrated in Figure 4, a gap exists between current exclusive breastfeeding rates in Kansas and those proposed by *Healthy People 2020*.



Source: Centers for Disease Control and Prevention National Immunization Survey, 2004 - 2009 births

Figure 3. Exclusive Breastfeeding Rates – Kansas versus United States



Source: Centers for Disease Control and Prevention National Immunization Survey, 2004 - 2009 births

Figure 4. Exclusive Breastfeeding Rates – Kansas versus Healthy People

Altogether, initiation of breastfeeding in Kansas is not problematic; however, duration of breastfeeding as recommended by the medical community and *Healthy People 2020* poses challenges for Kansas as well as for the rest of the nation. Many factors affect the initiation and duration of breastfeeding including public health policy, social determinants of breastfeeding, mothers' views of breastfeeding, and perceived barriers toward breastfeeding. To these, this paper will turn next.

Public Health Policy on Breastfeeding in Kansas

From a public health perspective, it is important that infants are exclusively breastfed for the first six months of life. Federal and state laws provide some protection for the breastfeeding mother. The Patient Protection and Affordable Care Act (2010) amended the Fair Labor Standards Act (1938) by requiring an employer to provide reasonable break time

for an employee to express breast milk for her infant up to one year after birth. An employer is not required to compensate an employee who uses break time to express breast milk. The law also requires an employer to provide a private space other than a bathroom to express breast milk. If this poses an undue hardship, then employers that employ less than 50 employees are not subject to these requirements. This law does not pre-empt state laws on breastfeeding especially when state laws provide better protection for the breastfeeding mother. The State of Kansas has enacted two specific laws regarding breastfeeding:

1. § 43-158 of Kansas Statutes Annotated allows a breastfeeding mother to be excused from jury duty and allows jury duty to be postponed until she no longer breastfeeds.
2. § 65-1,248 of Kansas Statutes Annotated provides that it is the state's public policy to support breastfeeding mothers and that she may breastfeed in any place she has a right to be.

Several states have unique laws related to breastfeeding such as California's mandated hospital training initiative to promote exclusive breastfeeding targeted at hospitals with patients who rank in the lowest 25 percent of the state's exclusive breastfeeding rates or New York's Breastfeeding Mothers Bill of Rights, which is required to be posted in maternal health care facilities (National Conference of State Legislatures, 2012). This study's findings are discussed within the framework of public health policy on breastfeeding in Kansas especially since this study is the only one ever conducted in the state.

Social Determinants of Breastfeeding

Another factor that influences breastfeeding rates are the social determinants of breastfeeding. Research shows that socio-economic factors such as mothers' level of education, age, employment status, and family income affect initiation and duration of

breastfeeding (Dubois & Girard, 2003; Flacking, Nyqvist, & Ewald, 2007; Kambale, 2011; Scott & Binns, 1999). Higher levels of education, older age, and higher income levels are all positively associated with a mother's decision to start and continue breastfeeding. One recent study showed that WIC (Special Supplemental Nutrition Program for Women, Infants, and Children, [WIC]) participants returning to work within 3 months post-partum were less likely to continue breastfeeding than mothers who returned to work after 7 months (Langellier, Chaparro, & Whaley, 2012). Against this background, this study examines how maternal demographics such as mothers' level of education, race, age, household composition, WIC status, and income level affect their decision to start and continue breastfeeding.

Mothers' Views of Breastfeeding: Knowledge, Beliefs, and Attitudes

Mothers' views of breastfeeding also affect breastfeeding rates. One of the reasons for low initiation and duration rates of breastfeeding may point to mothers' limited knowledge of breastfeeding along with their beliefs and attitudes toward breastfeeding (Almqvist-Tangen, Bergman, Dahlgren, Roswall, & Alm, 2012; Bertino, Varalda, Magnetti, Di Nicola, Cester, Occhi, Perathoner, Soldi & Prandi, 2012; Brand, Kothari, & Stark, 2011; Moore, & Coty, 2006). Children whose mothers do not have direct, personal knowledge how to successfully nurse their infant are at a great disadvantage in establishing healthy eating patterns early in life. By examining the knowledge, attitudes, and beliefs associated with breastfeeding, this study helps to improve the intention to breastfeed, which may positively influence initiation and duration rates of breastfeeding in Kansas communities.

Mothers' Perceived Barriers toward Breastfeeding

Another reason for low initiation and duration rates of breastfeeding may be attributed to maternal employment, inadequate prenatal and/or postnatal breastfeeding education, care of older siblings, lack of timely postpartum follow-up care, disruptive hospital policies and practices, social pressures, promotion of infant formula within the hospital or birth care settings, lack of societal support, and overall lack of guidance from health care professionals (AAP, 2005, 2012; Almqvist-Tangen et al., 2012; Bick, MacArthur, & Lancashire, 1998; Hatton, Harrison-Hohner, Coste, Dorato, Curet, & McCarron, 2005; Ortiz, McGillligan & Kelly, 2004; Polston Mills, 2009). It has also been found that post-partum depression affects the duration of breastfeeding and thus forms a barrier to breastfeeding if not addressed properly by health care professionals (Dennis & McQueen, 2007, 2009; Hatton et al., 2005). The present study describes the following barriers as perceived by mothers in their decision to start and continue breastfeeding: employment, breastfeeding education, care of older siblings, postpartum follow-up care, and hospital policies and practices.

Theoretical Framework

To meet the objectives of this study, two conceptual frameworks are adopted. First, the mother's breastfeeding behavior is discussed within Ajzen's Theory of Planned Behavior (1985, 1991). Second, the context within which the mother breastfeeds is discussed within Bronfenbrenner's (1979) ecological levels of analysis elaborated by Dalton and colleagues (2007).

A mother's decision to start and continue breastfeeding is guided by Ajzen's (1985, 1991) Theory of Planned Behavior (TPB). TPB is an extension of the Theory of Reasoned

Action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975; Madden, Ellen, & Ajzen, 1992) in that it includes measures of control belief and perceived behavioral control. Ajzen (1985, 1991) specifies that behavior depends on a person's motivation (intention) and perceived ability (behavioral control). Figure 5 shows how the TPB model is applied to breastfeeding practices. Behavioral beliefs precede a mother's attitude toward breastfeeding and represent her judgment that connects the breastfeeding behavior to a healthy outcome for herself and her infant. Normative beliefs represent a mother's expectations regarding breastfeeding behaviors of an important reference group (e.g., a sister, a friend, or her own mother). These beliefs along with wanting to gain approval from the reference group determine the mother's subjective norm toward breastfeeding, which in turn affects her intention to perform the breastfeeding behavior. Control beliefs represent a mother's belief that she has the skills, ability, resources, and opportunity to perform the breastfeeding behavior.

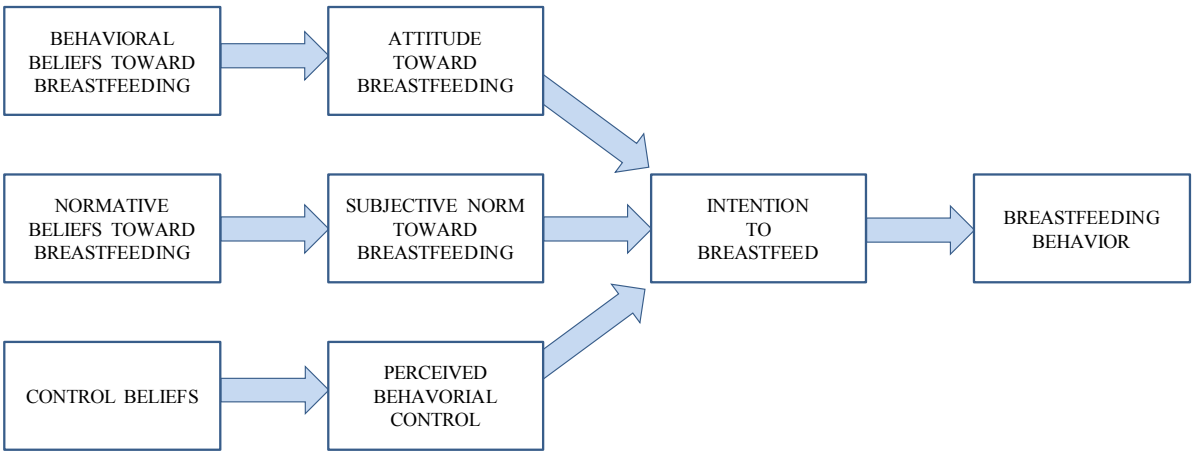


Figure 5. Theory of Planned Behavior and Breastfeeding

The context within which a mother resides influences her decision to start and continue breastfeeding. For example, family, friends, peers, workplace, school, social norms, and cultural heritage all play a role in her decision. Context is differentiated between proximal and distal systems (Dalton, Elias, & Wandersman, 2007). The proximal system comprises systems closest to the breastfeeding mother and involves mostly face-to-face contact. The distal system comprises systems less immediate to the breastfeeding mother yet having broad effects. There are four levels of analysis that include the breastfeeding mother who is embedded within micro-systems, organizations, localities, and macro-systems. The breastfeeding mother and these levels of analysis are interdependent as illustrated in Figure 6. This study attempts to identify how the levels of analysis impact a mother's decision to start and continue breastfeeding.

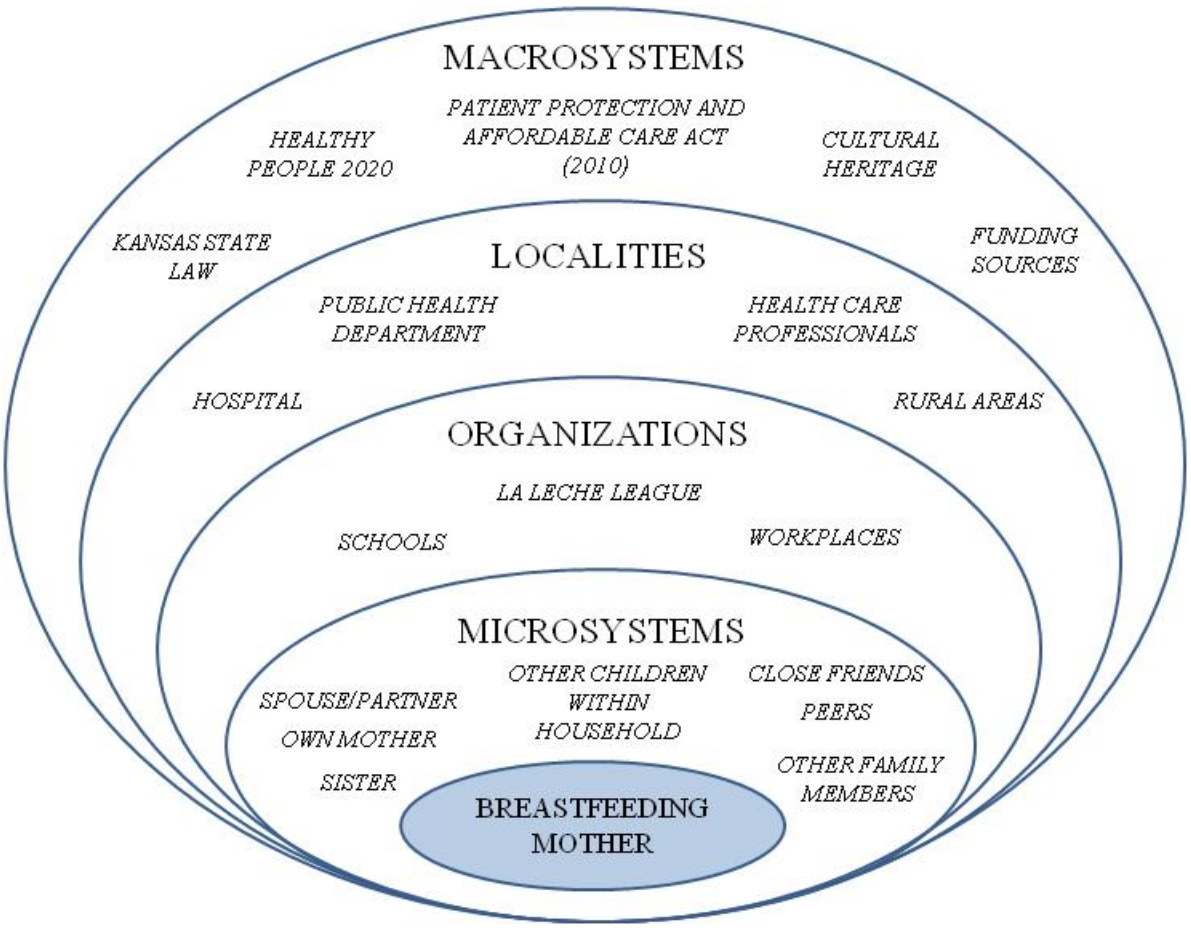


Figure 6. Ecological Levels of Analysis Surrounding the Breastfeeding Mother

Study Background

In the fall of 2010, the United Methodist Health Ministry Fund (UMHMF) of Hutchinson, Kansas, provided funding in the amount of $150,000 to support local public health departments across the state of Kansas in their efforts to promote breastfeeding rates in their communities. Local health departments could apply for a grant up to $10,000 each to assist them with their existing breastfeeding support program or to start a breastfeeding support program in 2011. Through a competitive grant application process, the Kansas Public Health Association (KPHA) distributed the funds and monitored compliance within

established guidelines. The funding period began January 1, 2011, and extended through December 31, 2011.

Nineteen local public health departments received funding, several of which received $10,000. These local health departments were located in the following counties: Barber, Cheyenne, Cloud, Coffey, Cowley, Dickinson, Douglas, Harper, Johnson, Labette, Lyon, Mitchell, Morris, Neosho, Pawnee, Reno, Sedgwick, Smith, and Wyandotte. The main purpose of the 2011 Breastfeeding Grant Initiative was to promote initiation and duration rates of breastfeeding in Kansas communities. Neither KPHA nor the University of Kansas School of Medicine-Wichita was involved in the design of each local health department's intervention.

This study attempts to answer the main research question of whether participation in a local health department's breastfeeding support program influences initiation and duration of breastfeeding in Kansas communities. This is accomplished through the exploration of the social determinants of breastfeeding, breastfeeding practices, mothers' views of breastfeeding, and their perceived barriers toward breastfeeding. The Human Subjects Committee at the University of Kansas School of Medicine-Wichita, the Institutional Review Board at Wichita State University, and the Institutional Review Board of the Kansas Department of Health and Environment approved the study.

CHAPTER 2

METHOD

Participants

All health departments that were awarded funds were invited to participate in the study; fifteen health departments agreed to participate. They include: Barber, Cheyenne, Coffey, Cowley, Dickinson, Douglas, Harper, Labette, Lyon, Mitchell, Morris, Neosho, Pawnee, Sedgwick, and Smith. All health departments are located in mostly rural areas of Kansas with the exception of Sedgwick County's health department. Women who had a live birth in one of these counties between July 1, 2010, and April 30, 2012 were eligible to participate in the research.

This study consists of an intervention group (n = 81) and a comparison group (n = 42). Participants in the intervention group received breastfeeding support services from their health department with the intent of increasing initiation and duration of breastfeeding. The intervention group consists of participants selected from each of the fifteen local health departments. A list of mothers' names, street address, city, zip code, and telephone number was requested from each health department. Participants on this list were randomly selected and contacted via telephone to participate in the survey. The principal investigator was able to contact 42.2% of participants on the provided list. Of 192 total potential participants, 81 agreed to participate. The majority of respondents in the intervention group were Caucasian/White (88.9%) followed by African American/Black (2.5%), American Indian/Alaskan Native (2.5%), Multi-racial (2.5%), Hispanic/Latino (1.2%), Asian (1.2%), and Other (1.2%). Surveys for this group were collected between July 1, 2011, and June 30, 2012 (see Figure 7).

In order to create a comparison group, a request was made to the Vital Statistics Data Analysis Section of the Bureau of Epidemiology and Public Health Informatics with the Kansas Department of Health and Environment to provide statistical information on live births within each of the fifteen participating counties. This information included date of infant's live birth along with a mother's name, street address, city, zip code, and county of residence. Participants were randomly selected after meeting two conditions. First, participants had to reside in one of the fifteen counties that agreed to participate. Second, priority was given to participants whose infants were born during the same month as infants from mothers in the intervention group. The principal investigator was able to contact 4.1% of participants on the provided list, none of whom had participated in a breastfeeding support program. Of 1,017 total potential candidates, 42 agreed to participate. Most respondents in the comparison group were Caucasian/White (97.6%) followed by African American/Black (2.4%). Surveys for this group were collected between July 1, 2012, and November 30, 2012 (see Figure 7).

Participants completed the survey via telephone or on-line. For participants who completed the survey via telephone, verbal consent was obtained immediately prior to the survey being collected during the same telephone call. Participants who completed their survey on-line consented by clicking to the next screen after reading a brief statement about the survey. Participants were informed of the purpose of the research and the length of time to complete the survey. They were also informed that participation would be completely voluntary, that there would be no right or wrong answers, and that they could discontinue answering questions any time. Participants were assured that participation in the survey would in no way affect current or future services. In the event a participant had questions or

concerns, she was provided with the name and contact information of the principal investigator. This research study presented no more than minimal risk of harm to participants and involved no procedures for which written consent would normally be required in accordance with the guidelines of the Human Subjects Committee at the University of Kansas School of Medicine-Wichita, the Institutional Review Board at Wichita State University, and the Institutional Review Board of the Kansas Department of Health and Environment.

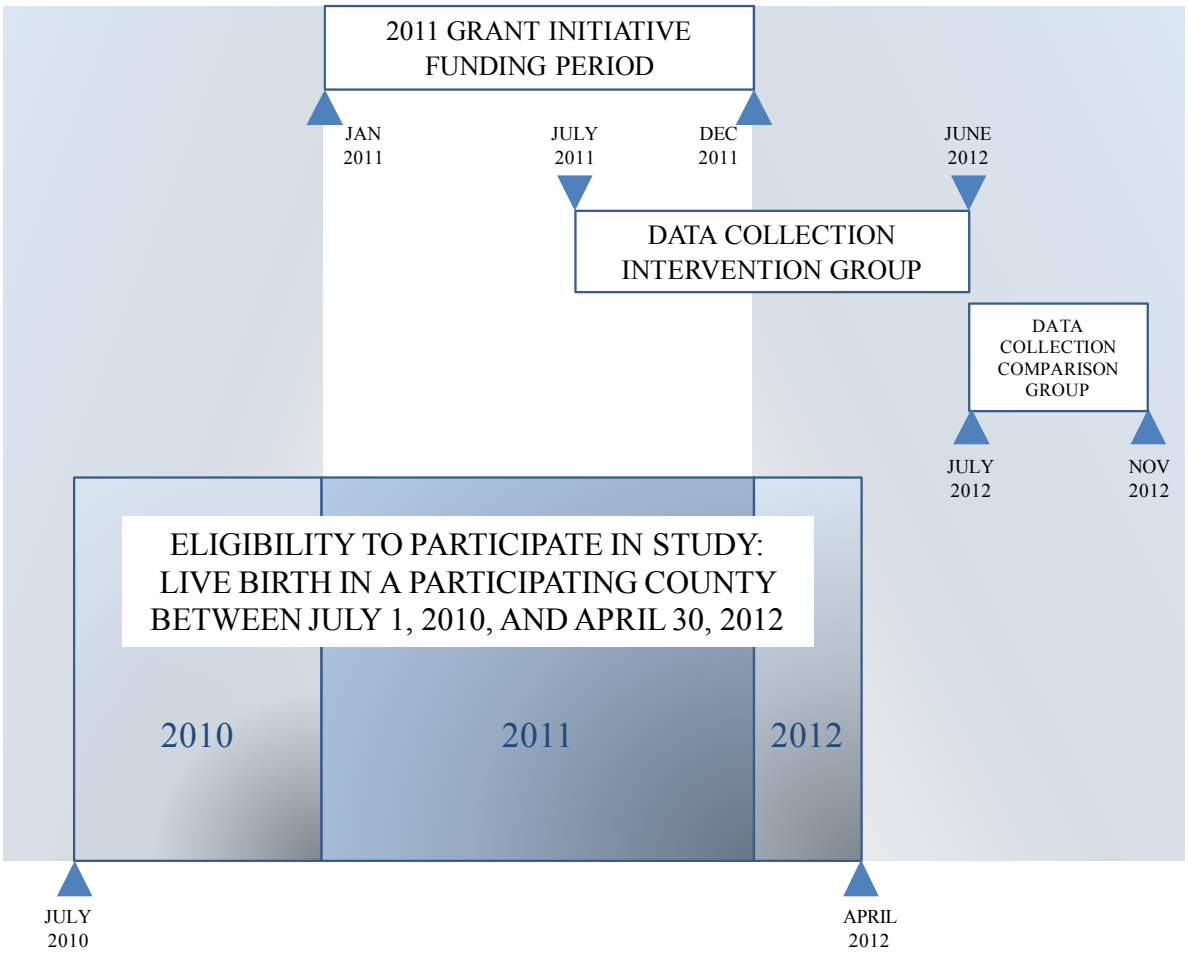


Figure 7. Timeline for Data Collection

Breastfeeding Initiative Evaluation Survey

Survey items selected for this study's survey (the Breastfeeding Initiative Evaluation Survey) are shown in Table 1 (see Appendix for the survey instrument). The survey instrument included items on breastfeeding from the Pregnancy Risk Assessment Monitoring System (PRAMS) questionnaire (CDC, 2011). The PRAMS questionnaire is a Centers for Disease Control and Prevention surveillance project that collects state-specific, population-based data on maternal attitudes and experiences prior to, during, and immediately following pregnancy. PRAMS questions selected for this study were intended to measure initiation of breastfeeding, duration of breastfeeding, infant/maternal demographics, breastfeeding practices, mothers' beliefs and attitudes, and perceived barriers. Initiation of breastfeeding refers to mothers who indicated that they breastfed or pumped breast milk to feed their infant after delivery. Duration of breastfeeding refers to the length of time mothers indicated that they breastfed or pumped breast milk to feed their infant.

Additional items were created to assess the mother's knowledge of breastfeeding services, use of pre/post-natal follow-up services, type/provider of breastfeeding services, and identification of mothers' perceived most valuable service in their decision to start and continue breastfeeding. The survey was pre-tested on five people. Their feedback consisted of speaking slowly and succinctly when talking with participants via telephone as well as clear identification and communication of the study's purpose. These suggestions were incorporated into the administration of the survey.

Table 1

Breastfeeding Initiative Evaluation Survey Items

Maternal Demographics
Race
Age
Household composition
Level of education
WIC status
Household income
Breastfeeding Practices
Initiation - Ever breastfed (yes/no)
Duration - Length of breastfeeding (in months)
Currently breastfeeding (yes/no)
Practice - Infant's age when first introduced to other liquids
Practice - Infant's age when first introduced to solid foods
Type(s) of breastfeeding services used
Provider of breastfeeding services
Mothers' Views of Breastfeeding: Knowledge, Beliefs, and Attitudes
Knowledge - Reasons to breastfeed infant
Knowledge - Most valuable service when mother decides to start breastfeeding
Knowledge - Most valuable service when mother decides to continue breastfeeding
Beliefs - Thoughts about breastfeeding
Attitudes - Agreement on mother/infant bonding, breast milk is healthier/ideal food
Mothers' Perceived Barriers toward Breastfeeding
Infant's length of stay in hospital
Reason(s) for stopping breastfeeding
Reason(s) for not starting breastfeeding
Timing/place of breastfeeding when mother returns to work or school
Follow-up services within 10 days after birth
Timing of follow-up care provided by breastfeeding educator

Procedure

The survey instrument began with a brief introduction that informed the participant of the purpose of the research and that her participation would be completely voluntary. Length of time to answer the survey questions was estimated to be between ten to fifteen minutes, which was based on the length of time it took five trial participants to complete the survey. The survey instrument was administered by the principal investigator only. Participants in the intervention group completed the survey via telephone whereas participants in the comparison group completed it on-line. Officials with the Kansas Department of Health and Environment have interpreted two pieces of Kansas legislation [§65-1,157 a and §65-180 (d)] as meaning that a parental telephone number may not be provided to researchers for other purposes than program management (L. Saadi, personal communication, February 4, 2013).

As a result of this interpretation, a letter was mailed via U.S. mail to participants for the comparison group inviting them to participate in the study. The letter provided participants with a link to access and complete the survey on-line. In the event that participants did not have access to a computer, the letter also provided them with a telephone number, which was the direct number to the principal investigator who then surveyed the participant via telephone. One follow-up postcard was mailed via U.S. mail to invite comparison group participants to complete the survey. The survey was administered at least three to four months after birth. No incentive to participate in the study was offered.

CHAPTER 3

RESULTS

Survey data were analyzed using IBM SPSS Version 20 and screened for errors. One case was deleted as the participant did not complete the survey beyond entering her county of residence. Responses to open-ended questions were analyzed for themes using procedures described by Creswell, 2013, and Creswell & Plano Clark, 2011. Overall results indicate that breastfeeding interventions in Kansas influence initiation and duration of breastfeeding.

Demographics

The demographic composition of the intervention and comparison groups varied along county residence, maternal age, maternal level of education, WIC status, and household income. Participants in the intervention group reported having more children under the age of one. They also reported caring for more children over the age of six. Nearly all participants reported having a spouse or partner.

Table 2 shows study participants from each participating county.

Table 2

Number of Participants by County

Characteristic	Intervention n=81	Comparison n=42
County		
Barber	4 (4.9%)	1 (2.4%)
Cheyenne	6 (7.4%)	-
Coffey	2 (2.5%)	3 (7.1%)
Cowley	4 (4.9%)	4 (9.5%)
Dickinson	8 (9.9%)	3 (7.1%)
Douglas	11 (13.6%)	18 (42.9%)
Harper	3 (3.7%)	1 (2.4%)
Labette	6 (7.4%)	4 (9.5%)
Lyon	2 (2.5%)	2 (4.8%)
Mitchell	3 (3.7%)	1 (2.4%)
Morris	7 (8.6%)	-
Neosho	14 (17.3%)	4 (9.5%)
Pawnee	9 (11.1%)	-
Sedgwick	2 (2.5%)	1 (2.4%)
Smith	-	-

Table 3 shows maternal demographics by race, age, level of education, WIC status, and household income. The chi-square value was not significant for race indicating that the distribution for each group was similar on race. Conversely, the chi-square value was significant for age, level of education, WIC status, and household income indicating that both groups differed along these demographic characteristics. Overall, there were a total of 123 respondents in both intervention and comparison groups. The majority of study participants were Caucasian/White, between the age of 26 and 35, and college-educated. Over one third of participants received WIC benefits and over half of all participants earned less than $50,000 per year.

Table 3

Maternal Demographics - Race, Age, Education, WIC Status, Household Income

Characteristic	Intervention n=81	Comparison n=42	X^2	Demographic Composition Total
Race			3.77 ($df = 6, p = .708$)	
Caucasian/White	72 (88.9%)	41 (97.6%)		113 (91.9%)
African American/Black	2 (2.5%)	1 (2.4%)		3 (2.4%)
Hispanic/Latino	1 (1.2%)	-		1 (0.8%)
American Indian/Alaskan Native	2 (2.5%)	-		2 (1.6%)
Asian	1 (1.2%)	-		1 (0.8%)
Native Hawaiian/Pacific Islander	-	-		-
Multi-racial	2 (2.5%)	-		2 (1.6%)
Other	1 (1.2%)	-		1 (0.8%)
Age in Years			9.72 ($df = 3, p = .021$)	
Less than 18	2 (2.5%)	-		2 (1.6%)
Between 18 and 25	27 (33.3%)	5 (11.9%)		32 (26.0%)
Between 26 and 35	46 (56.8%)	29 (69.1%)		75 (61.0%)
Between 36 and 45	6 (7.4%)	8 (19.1%)		14 (11.4%)
Between 46 and 55	-	-		-
Over 55	-	-		-
Mother's Education Level			15.40 ($df = 6, p = .017$)	
Some high school	3 (3.7%)	-		3 (2.4%)
Graduated from high school	9 (11.1%)	4 (9.5%)		13 (10.6%)
Vocational, trade, or technical school	8 (9.9%)	1 (2.4%)		9 (7.3%)
Junior or community college	24 (29.6%)	4 (9.5%)		28 (22.8%)
Four-year college degree	23 (28.4%)	21 (50.0%)		44 (35.8%)
Advanced Degree	12 (14.8%)	12 (28.6%)		24 (19.5%)
Other	2 (2.5%)	-		2 (1.6%)
Not sure	-	-		-
WIC Status			19.90 ($df = 1, p = .001$)	
Yes	42 (51.9%)	4 (9.5%)		46 (37.4%)
No	39 (48.1%)	38 (90.5%)		77 (62.6%)
Household Income			13.37 ($df = 3, p = .004$)	
Less than $24,999	31 (38.3%)	5 (11.9%)		36 (29.3%)
$25,000 to $49,999	23 (28.4%)	10 (23.8%)		33 (26.8%)
$50,000 to $74,999	15 (18.5%)	10 (23.8%)		25 (20.3%)
$75,000 or more	12 (14.8%)	17 (40.5%)		29 (23.6%)

Table 4 shows household composition by group. Most participants reported having a spouse or partner. Participants in the intervention group reported having more children less than 12 months of age and fewer children aged one to five years than those in the comparison group. This difference is mainly due to the timing of data collection for each group. Data for participants in the comparison group were collected later than for those in the intervention group, which resulted in responses that pertained to infants who were over the age of one. Additionally, the number of children per household was similar for both groups. Participants in the intervention group had on average two children over the age of six versus one child over the age of six for comparison group participants.

Table 4

Maternal Demographics - Household Composition

Characteristic	Intervention n=81	Comparison n=42
Spouse or partner		
Yes	69 (85.2%)	40 (95.2%)
No	12 (14.8%)	2 (4.8%)
Children less than 12 months		
Yes	73 (90.1%)	14 (33.3%)
No	8 (9.9%)	28 (66.7%)
Children aged 1 to 5 years		
Yes	31 (38.3%)	35 (83.3%)
No	50 (61.7%)	7 (16.7%)
Children aged 6 and over		
Yes	21 (25.9%)	11 (26.2%)
No	60 (74.1%)	31 (73.8%)

Breastfeeding Practices

The majority of all participants, more than 95%, indicated that they breastfed or pumped breast milk after delivery. Three cases in the intervention group and two cases in the comparison group indicated that they had never breastfed. Duration of breastfeeding for all participants was on average 6 ½ months. The majority of participants reported using the services of a breastfeeding support educator frequently. Most breastfeeding services were initially provided by the hospital.

Length of breastfeeding varied for each group. Participants in the intervention group breastfed an average of 5.41 months (*SD* = 4.58) ranging from four weeks to twenty months. Participants in the comparison group breastfed an average of 8.96 months (*SD* = 6.07) ranging from two weeks to twenty four months. A note of discretion must be exercised here. It is expected that duration for mothers in the comparison group would be longer because the majority indicated that they completed breastfeeding as opposed to the majority of mothers in the intervention group, who were still breastfeeding at the time of data collection. The evidence for this comes from the demographic characteristics, which show that mothers in the intervention group have more children under the age of one versus mothers in the comparison group. This finding is also corroborated by participants' responses to the survey item whether they were currently still breastfeeding: 65.4% of mothers in the intervention group and 32.5% of mothers in the comparison group were still breastfeeding at the time of survey completion.

Additionally, participants in each group varied along timing of introduction to other liquids besides breast milk and solid foods. Intervention group participants introduced other liquids for the first time when their infant was about 2.4 months of age and solids when their

infant was about 2.5 months of age. Participants in the comparison group first introduced liquids when their infant was about 4.4 months of age and solids when their infant was about 5.1 months of age.

Multiple regression was conducted to assess predictors related to length of breastfeeding. There were two such analyses; one used maternal demographics and the other used types of breastfeeding services as predictors of duration of breastfeeding. Both regression equations were significant.

With the first regression, the analysis was conducted on the intervention and comparison groups combined. Predictor variables of interest included timing of introduction to other liquids, timing of introduction to solid foods, maternal age, level of education, and household income. The results of the regression may be found in Table 5. The linear combination of all predictors was significantly related to breastfeeding duration, $F(5,112) = 30.41$, $p < 0.01$, $R^2 = 0.59$, adjusted $R^2 = 0.57$. Thus, 59% of breastfeeding duration can be accounted for by its linear relationship with the five predictor variables. Interestingly, two of the five individual predictor variables – age and income – were not statistically significant. Pearson's correlation coefficient (r) for each variable was significantly related to length of breastfeeding.

Table 5

Regression of Breastfeeding Duration as a Function of Maternal Demographics for Intervention and Comparison Groups Combined

Variables	B	SE	β	r	t	p
(Constant)	-0.657	1.571			-0.418	0.676
Timing of introduction to liquids	0.675	0.129	0.447	0.698	5.252	0.001
Timing of introduction to solids	0.523	0.156	0.299	0.662	3.352	0.001
Maternal age	0.479	0.619	0.059	0.328	0.774	0.441
Maternal level of education	0.777	0.315	0.195	0.430	2.466	0.015
Household income	-0.623	0.347	-0.134	0.190	-1.794	0.076

With the second regression, the analysis was conducted on the intervention group excluding the comparison group. Predictor variables of interest included six types of breastfeeding services including educational materials, education classes, breastfeeding support educator, peer support, breastfeeding resources, and employer support. Table 6 shows that the linear combination of all predictors was significantly related to breastfeeding duration, $F(6,77) = 6.82$, $p < 0.01$, $R^2 = 0.37$, adjusted $R^2 = 0.31$. Thus, 37% of breastfeeding duration can be accounted for by its linear relationship with these six predictor variables. Only two of the six individual predictors – educational materials and peer support – were statistically significant.

Table 6

Regression of Breastfeeding Duration as a Function of Breastfeeding Services for Intervention Group Only

Variables	B	SE	β	r	t	p
(Constant)	5.427	2.945			1.843	0.070
Educational materials	-4.163	0.982	-0.445	-0.473	-4.240	0.001
Education classes	-1.105	0.898	-0.121	-0.215	-1.230	0.223
Breastfeeding educator	1.145	1.118	0.108	0.122	1.024	0.309
Peer support	2.222	1.071	0.217	0.369	2.074	0.042
Breastfeeding resources	1.002	0.960	0.109	0.089	1.044	0.300
Employer support	1.575	1.098	0.140	0.189	1.435	0.156

Table 7 shows the types of breastfeeding services used by participants. All participants reported that they frequently used the services of a breastfeeding support educator followed by the use of educational materials and breastfeeding resources.

Table 7

Utilization of Breastfeeding Services

Characteristic	Intervention n=78	Comparison n=40
Educational materials	48 (61.5%)	18 (45.0%)
Education class	35 (44.9%)	8 (20.0%)
Breastfeeding support educator	59 (75.6%)	25 (62.5%)
Breastfeeding peer support group	21 (26.9%)	4 (10.0%)
Received breastfeeding resources	45 (57.7%)	9 (22.5%)
Employer provided designated room with breastfeeding equipment	16 (20.5%)	7 (17.5%)
Other	21 (26.9%)	7 (17.5%)

Note. Responses do not add up to 100 percent as participants were allowed to check multiple answers.

The open-ended data were classified into themes followed by a broader interpretation within the context of the purpose of the research and two doctoral students assisted with this process. Open-ended data collected focused on four main themes: hospital resources, health department resources, successful breastfeeding with previous births, and support from family, friends, and peers. One participant reported "*They had a lactation consultant meet with me in the hospital (within 12 hours of delivery) to see if he was latching on well and if I had any questions, concerns, needs. They did a wonderful job of encouraging me*." Other participants reported the value of the services provided by their local health departments such as the rental or purchase of breast pumps and educational materials. The birth of a previous child coupled with one-on-one lactation support helped a few participants in their decision to breastfeed their new infant. Furthermore, one participant reported that she breastfed her other children and valued the peer support she received with her new infant. Several participants reported that their own mother was instrumental with support of breastfeeding. Though most participants reported that the hospital and its lactation specialist were helpful with breastfeeding, one participant reported receiving a formula support bag from the hospital while another reported "*I was lucky enough to have a family friend who is a nurse practitioner/midwife who came over every day for a couple of weeks to help me with nursing. Pro nursing & I would not have been able to do it without her. The nurses were not helpful or pro breastfeeding at the hospital*."

Table 8 shows the provider of breastfeeding services. All participants received the majority of breastfeeding services from the hospital followed by the breastfeeding support educator. Interestingly, even though participants in the comparison group did not officially receive services from their health department, a few indicated that their health department

provided them with services. One participant expressed that she was very happy to see a local health department provide breastfeeding services in a small community. She added "*We have a lot of underprivileged children here and it is good to know that they can have a good start in life*." Upon further examination of qualitative responses, it was concluded that responses resembled the answers provided in Table 8.

Table 8

Provider of Breastfeeding Services

Characteristic	Intervention n=78	Comparison n=40
Hospital	52 (66.7%)	27 (67.5%)
Family physician or pediatrician	15 (19.2%)	10 (25.0%)
County health department	57 (73.1%)	5 (12.5%)
LaLeche League	11 (14.1%)	6 (15.0%)
Breastfeeding support clinic	5 (6.4%)	2 (5.0%)
Breastfeeding support educator	37 (47.4%)	12 (30.0%)
Other	11 (14.1%)	9 (22.5%)

Note. Responses do not add up to 100 percent as participants were allowed to check multiple answers.

Mothers' Views of Breastfeeding

Knowledge of Breastfeeding. The majority of all participants reported nutritional and health benefits for their infant as the main reason in their decision to breastfeed or pump breast milk (see Table 9). A few participants provided additional comments that weighed in on a mother's decision to breastfeed including successful breastfeeding by the participant's mother or grandmother and lower cost of breast milk compared to formula. One participant

reported that "*Breastfeeding aids in the facial/oral development of the muscles for speech and palate formation-among many other benefits to mother and child*."

When asked about the value of breastfeeding services in their decision to start and continue breastfeeding, participants' responses were varied (see Table 9). All participants reported the services of a breastfeeding support educator as important in their decision to *start* breastfeeding. Participants valued educational materials and education classes as well. Mothers also provided additional comments to this survey item. Comments focused on five themes: individual perception of breastfeeding, familial and peer support, previous experience with breastfeeding, guidance from health care professionals, and breastfeeding resources.

Individual perception of breastfeeding refers to participants' judgment to start breastfeeding. For example, one participant reported "*I wanted to. It [breastfeeding] was important to me*" while another stated that "*I am a medical professional (PA-C) and knew of the benefits of breastfeeding. It was my personal choice to breastfeed from the beginning*."

Familial and peer support refer to support from participants' own mothers, friends, siblings, and peers. Participants reported that support from their own mother was critical in their decision to start breastfeeding. For instance, one participant reported "*My mother breastfed. Family support is important in breastfeeding*." Others reported that family support in general was important. None of the participants specifically mentioned spousal support in her decision to start breastfeeding. Though, one participant reported the importance of spousal support in combination with family support in her decision to start and continue breastfeeding, "*Spouse and family support is very critical in deciding to breastfeed and continuing to breastfeed*."

Participants' previous experience with breastfeeding was also important. This had an effect on whether they were willing to breastfeed their current infant. It appeared that mothers who breastfed before were more likely to breastfeed again. One participant reported "*I breastfed my first child and knew I would with this one as well. It did not matter what others thought or how popular it was at the time I was going to do it*."

Guidance from health care professionals was important as well. One participant reported that though the nurses were not specialized in breastfeeding, they helped her when deciding to start breastfeeding as they told her about their personal experiences with breastfeeding. Another participant referred to a local health department representative by name when she received assistance, "*If it were not for her [health department representative], I probably would never have started breastfeeding because I didn't think I produced enough milk*."

Several participants reported that using the internet or books to learn about breastfeeding was helpful in their decision to start breastfeeding. For example, one participant found a group of mothers over the internet who gave birth during the month of November and called themselves the "November Babies." Several participants reported benefiting from a combination of resources. For instance, one participant reported conducting research over the internet and receiving information on the nutritional benefits of breastfeeding at school. Another participant reported that her family's support, her own research, and books authored by Penny Simkin helped her with her decision to start breastfeeding.

In their decision to *continue* breastfeeding, all participants perceived the services of a breastfeeding support educator as valuable. Peer support and educational materials were

important as well. Mothers also provided additional comments to this survey item. Comments focused on the following six themes: individual perception of breastfeeding, familial and peer support, previous experience with breastfeeding, guidance from health care professionals, availability of breastfeeding equipment, and employer support. Perception of breastfeeding, familial/peer support, previous experiences, and professional guidance are also identified as being important with initiation of breastfeeding and responses do not vary much within the context of breastfeeding duration.

Several participants used their judgment to continue breastfeeding, which is reflected in statements such as "*It [breastfeeding] was the right thing to do*," "*It's the best source of nutrition for baby*," "*Support or not, I would have breastfed*," and "*Cost for our family and health of our baby was my reason to continue*." Others reported previous breastfeeding experience as important and were more likely to breastfeed again.

Similar to previous responses, participants reported support from family and friends as important though one participant reported that support from the LaLeche League was critical in her decision to continue breastfeeding. Another participant reported benefiting from both her family's support and a breastfeeding educator, "*I can call her [referring to a breastfeeding educator with the health department] anytime if I have questions*."

Responses regarding guidance from health care professionals were similar to those reported previously including assistance from nurses, hospital staff, local health department representatives, WIC personnel, and a breastfeeding educator. Several participants specifically mentioned breastfeeding support services provided by their health department as being helpful in their effort to continue breastfeeding.

Additionally, availability of breastfeeding equipment and employer support of breastfeeding influenced breastfeeding. Several participants reported that breast pumps were critical to the duration of breastfeeding. This is reflected in the following statement "*If it weren't for the pump I could have never returned to school*." Other participants reported support they received from their employers was important to continue with breastfeeding efforts. One participant expressed that if it had not been for the breast pump in combination with her employer's support, she would not have been able to continue breastfeeding. Another reported "*With my first daughter it was incredibly helpful that my work was so accommodating when it came to breastfeeding. If I had not been able to pump regularly or nurse her regularly I would not have been able to keep up my supply to continue to nurse her until she was a year*." Conversely, one participant reported that she discontinued breastfeeding after a few days as she had to return to work and her employer was not supportive of breastfeeding.

Table 9

Mothers' Views of Breastfeeding - Knowledge

Characteristic	Intervention	Comparison
Reason to decide breastfeeding or to pump breast milk	n=78	n=40
Nutritional and health benefits to infant	65 (83.3%)	34 (85.0%)
Breastfeeding is not as expensive as formula	3 (3.9)%	2 (5.0%)
Ease of breastfeeding over using formula	1 (1.3%)	-
Breastfeeding helps with mother-infant bonding	5 (6.4%)	2 (5.0%)
Other	4 (5.1%)	2 (5.0%)
Most valuable service in decision to *start* breastfeeding	n=78	n=39
Educational materials	14 (17.9%)	13 (33.3%)
Education classes	17 (21.8%)	2 (5.1%)
Breastfeeding support educator	17 (21.8%)	12 (30.8%)
Breastfeeding peer support group	6 (7.7%)	1 (2.6%)
Follow-up service within 10 days of baby's birth	2 (2.6%)	2 (5.1%)
Breastfeeding support bag	-	-
Breastfeeding equipment	6 (7.7%)	-
Breastfeeding support clinic	1 (1.3%)	-
Employer's policy on breastfeeding	-	-
Other	15 (19.2%)	9 (23.1%)
Most valuable service in decision to *continue* breastfeeding	n=78	n=38
Educational materials	3 (3.8%)	8 (21.1%)
Education classes	4 (5.1%)	1 (2.6%)
Breastfeeding support educator	18 (23.1%)	8 (21.1%)
Breastfeeding peer support group	16 (20.5%)	2 (5.3%)
Follow-up service within 10 days of baby's birth	3 (3.8%)	1 (2.6%)
Breastfeeding support bag	-	1 (2.6%)
Breastfeeding equipment	12 (15.4%)	4 (10.5%)
Breastfeeding support clinic	-	-
Employer's policy on breastfeeding	2 (2.6%)	5 (13.2%)
Other	20 (25.6%)	8 (21.1%)

Beliefs and Attitudes toward Breastfeeding. Table 10 and Table 11 demonstrate participants' responses to beliefs and attitudes toward breastfeeding. Responses did not vary much for either survey item. More than 87% of respondents knew that they would breastfeed their infant. Most participants strongly agreed that infants who were fed breast milk are healthier than those who were formula-fed, that breastfeeding increases mother-infant bonding, and that breast milk is the ideal food for infants.

Table 10

Mothers' Views of Breastfeeding - Beliefs

Characteristic	Intervention n=78	Comparison n=40
I knew I would breastfeed	68 (87.2%)	35 (87.5%)
I thought I might breastfeed	7 (9.0%)	5 (12.5%)
I knew I would not breastfeed	1 (1.3%)	-
I didn't know what to do about breastfeeding	2 (2.6%)	-

Table 11

Mothers' Views of Breastfeeding - Attitudes

Characteristic	Intervention n=78	Comparison n=40
Breastfeeding increases mother-infant bonding		
Neutral	2 (2.6%)	4 (10.0%)
Agree	17 (21.8%)	6 (15.0%)
Strongly agree	59 (75.6%)	30 (75.0%)
Babies fed breast milk are healthier than babies who are fed formula		
Strongly disagree	-	1 (2.5%)
Disagree	1 (1.3%)	2 (5.0%)
Neutral	15 (19.2%)	5 (12.5%)
Agree	24 (30.8%)	9 (22.5%)
Strongly agree	38 (48.7%)	23 (57.5%)
Breast milk is the ideal food for babies		
Neutral	2 (2.6%)	3 (7.5%)
Agree	18 (23.1%)	4 (10.0%)
Strongly agree	58 (74.4%)	33 (82.5%)

In summary, with regard to knowledge of breastfeeding, most participants reported the nutritional and health benefits for their baby as important in their decision to start breastfeeding. The majority of mothers also perceived the services of a breastfeeding educator as most valuable in their decision to start and continue breastfeeding. Mothers provided additional comments to this survey item as well. Concerning beliefs toward breastfeeding, most participants reported that they knew they would breastfeed. The majority of participants also held positive attitudes toward breastfeeding.

Mothers' Perceived Barriers toward Breastfeeding

As previously indicated, five participants decided not to breastfeed. Reasons for not breastfeeding included maternal medical conditions, perceived insufficient milk production, and successful bottle-feeding of previous children. One participant did not provide a reason. Table 12 demonstrates baby's length of stay in the hospital. More than fifty percent of participants reported their babies staying in the hospital between 24 to 48 hours. Over one third of participants in the intervention group reported their baby's stay to be between 3 to 5 days.

Table 12

Mothers' Perceived Barriers - Baby's Length of Stay in Hospital

Characteristic	Intervention n=81	Comparison n=42
Less than 24 hours (less than 1 day)	3 (3.7%)	-
24 to 48 hours (1 to 2 days)	43 (53.1%)	22 (52.4%)
3 to 5 days	30 (37.0%)	5 (11.9%)
6 to 14 days	4 (4.9%)	6 (14.3%)
More than 14 days	-	2 (4.8%)
My baby was not born in the hospital	1 (1.2%)	7 (16.7%)
My baby is still in the hospital	-	-

Participants' reasons for discontinuing breastfeeding are shown in Table 13. A number of participants in the intervention group thought that their baby had difficulty latching or nursing, that they did not produce adequate milk, and that breast milk alone did not satisfy their baby. All participants provided additional comments to this survey item that

focused mainly on three themes: ease of bottle-feeding, natural weaning, and stress reduction for the mother. Ease of bottle-feeding refers to mother and infant being comfortable with a bottle rather than the breast or expressed breast milk. This sentiment is reflected in statements such as "*I felt my baby was uninterested in breastfeeding (very easily distracted), I knew that he liked taking a bottle as much as breastfeeding, and he wasn't breastfeeding/taking a bottle very often, because he had transitioned to mostly semi-solid foods*" and "*My baby fed better with a bottle*." Natural weaning refers to participants' reports that they did not want to continue breastfeeding or their infant no longer wanted to breastfeed. Statements reflective of this belief include "*The baby weaned herself at 6-7 months, I am a stay at home mom*," "*He was a year old and weaned himself*," and "*I only planned to breastfeed for 12 months. Once my baby turned that age, I weaned her. She is 17 months now*." Stress reduction as a reason to discontinue breastfeeding refers to participants who had multiple births and participants who experienced breastfeeding as stressful due to other responsibilities such as work and care of other children. Three participants reported having multiple births: "*I had twins and simply could not keep my supply up for longer than a month. And I was completely exhausted, especially with having a 2 year old child in the home as well*," "*There were other stressful experiences in my life and one twin took longer to breastfeed than the other*," and *"My babies were premature (I had twins) and my milk never came in fully. I pumped for 5 weeks and got only teaspoons. I tried prescription medications, but never developed milk*." Other participants referred to breastfeeding as being stressful due to other reasons such as "*Stopped for my sanity. I thought I would nurse/pump for a full year. I made a choice to be a happier mom for my son. It made me very sad, but once I was finished I felt like myself and become a happier and healthier Mom*

and wife!," "*I got tired of pumping (I couldn't breastfeed due to latch issues, so pumping was the normal)*," and "*When I gave birth to my youngest child I also had a one year old and a two year old, that coupled with my work as a night shift RN made breast feeding difficult*."

Table 13

Mothers' Perceived Barriers - Reasons to Stop Breastfeeding

Characteristic	Intervention n=78	Comparison n=40
Baby had difficulty latching or nursing	6 (7.7%)	-
Breast milk alone did not satisfy baby	6 (7.7%)	3 (7.5%)
Thought that baby was not gaining enough weight	2 (2.6%)	1 (2.5%)
Nipples were sore, cracked, or bleeding	2 (2.6%)	-
It was too hard, painful, or too time consuming	2 (2.6%)	1 (2.5%)
Thought she was not producing enough milk	13 (16.7%)	3 (7.5%)
Had too many other household duties	2 (2.6%)	1 (2.5%)
Felt it was the right time to stop breastfeeding	4 (5.1%)	11 (27.5%)
Got sick and was not able to breastfeed	1 (1.3%)	3 (7.5%)
Went back to work or school	5 (6.4%)	2 (5.0%)
Baby was jaundiced	1 (1.3%)	-
Other	10 (12.8%)	11 (27.5%)

Note. Responses do not add up to 100 percent as participants were allowed to check multiple answers.

Participants' responses to what they thought should happen when a mother wants to breastfeed at her place of work or at school are shown in Table 14. The majority of respondents reported that a mother should be able to use break time to pump milk followed by being able to use break time to breastfeed baby. Most participants who provided comments were stay-at-home mothers or had re-entered the work force after having taken time off to care for their child(ren). A common area of concern focused on the need for

employers' flexibility when a breastfeeding mother returns to work and the need for a private space other than a bathroom to express breast milk. A couple of participants appreciated their employer's pro-breastfeeding policies, but noted their lack of enforcement illustrated with the following comment: "*At my last place of employment, there was a designated nursing room on our floor, and many of the male employees would use it for making personal calls. This was frustrating when I had a designated time to pump, and that time was cut into because of their inappropriate use of the room. I think more advocacy for the importance of breastfeeding in the workplace would have been beneficial*." A few participants reported that their employer did not allow them to breastfeed at work.

The need for employers to be flexible when a breastfeeding mother returns to work is reflected in responses such as "*I have started my nurse practitioner job and it is in a retail clinic setting. My daughter was about 9 months at that time. It was much more difficult to pump once I got off of orientation and was on my own as you are in the clinic alone and if patient's are waiting they have a difficult time understanding why you must take a break, then I would feel guilty. I did end up quitting pumping and my daughter naturally seemed to wean herself from nursing at around 11 months . . . . Now I am pregnant with my second child and fear for my current job and being able to pump. Makes me stressed thinking about it so I try not to*." Other participants expressed similar concerns including "*I'll go back to school, finding a place to breastfeed would be difficult*," "*A mom should be able to breastfeed when needed*," and "*I'm not allowed to bring my baby to breastfeed*."
Yet, several participants reported being satisfied with how their employer handled their return to work: "*I was able to work a flexible schedule allowing me to come home and breastfeed and work the remainder of the day from home*," "*I have a flexible schedule being*

a salaried employee and I took breaks as needed," and "*We are encouraged to do so, they even have a room for it, but the reality of working as a nurse does not always allow time*."

Table 14

Mothers' Perceived Barriers - Workplace and School

Characteristic	Intervention n=78	Comparison n=40
She can keep her baby and baby can breastfeed as needed	10 (12.8%)	4 (10.0%)
She can use break time to breastfeed baby	20 (25.6%)	9 (22.5%)
She can use break time to pump milk	55 (70.5%)	22 (55.0%)
It is hard to use breaks or find a place to pump or breastfeed	14 (17.9%)	6 (15.0%)
She is not allowed to breastfeed baby at work or school	1 (1.3%)	-
Don't know	1 (1.3%)	2 (5.0%)
Other	16 (20.5%)	15 (37.5%)

Note. Responses do not add up to 100 percent as participants were allowed to check multiple answers.

Table 15 shows participants' responses to the use of follow-up services within ten days after birth and timing of support provided by a breastfeeding support educator. The majority of respondents received follow-up services within ten days of their baby's birth. Over half of all participants received support immediately *after birth of baby* or both *before and after birth of baby*. More than one third of participants in the comparison group reported not receiving support from a breastfeeding support educator at all.

Table 15

Mothers' Perceived Barriers - Follow-up Services and Timing of Initial Support

Characteristic	Intervention	Comparison
Follow-up services within 10 days after birth	n=78	n=40
Yes	55 (70.5%)	27 (67.5%)
No	19 (24.4%)	10 (25.0%)
Don't know	4 (5.1%)	3 (7.5%)
Initial contact by breastfeeding support educator	n=78	n=39
Did not receive support from a breastfeeding educator	17 (21.8%)	15 (38.5%)
Before birth of baby	3 (3.8%)	3 (7.7%)
After birth of baby	31 (39.7%)	12 (30.8%)
Both before and after birth of baby	27 (34.6%)	9 (23.1%)

In summary, the majority of participants reported that their baby's length of stay in the hospital was between 24 to 48 hours. A number of participants in the intervention group discontinued breastfeeding because of beliefs surrounding milk production. Additional comments to this survey item were provided. Also, the majority of participants thought that a mother should be able to use break time to pump milk and that employers should provide mothers with a private room to express breast milk. Most participants reported receiving follow-up services after delivery.

CHAPTER 4

DISCUSSION

From a public health perspective, it is important that infants are breastfed for the first six months of life. Improvement of low breastfeeding rates requires a collaborative effort by many parties. By improving breastfeeding rates, children will have increased protection from infectious disease and chronic conditions, which may require less hospitalization. Mothers will have a reduced risk of certain cancers and type 2 diabetes. Additionally, the U.S. could gain to save billions of dollars per year from better breastfeeding practices.

Yet, despite the short- and long-term health benefits of breastfeeding for mother, infant, and society, breastfeeding initiation and duration rates remain low. Compared to national breastfeeding rates, the state of Kansas performs well with breastfeeding initiation, but can improve with breastfeeding duration. To help promote breastfeeding, it is critical that breastfeeding support services are available to those who need them. More importantly, evaluation of these services to determine their effectiveness is important.

This study's findings demonstrate that there are several variables that positively affect breastfeeding rates in Kansas communities. Ideally, the effect of the breastfeeding intervention should be separated from other factors that influence the results of this study. However, this cannot be accomplished due to selection of study participants. All mothers volunteered to participate and this plays a critical role in this study. Volunteer selection indicates that there is some interest in breastfeeding, which influences the outcome of this study. Additionally, it is important to note that breastfeeding rates depend on many factors and the ones examined in this study are merely a few. The context within which the mother decides to start and continue breastfeeding is equally important.

Theoretical Framework as Applied to Breastfeeding

Mothers' knowledge, attitudes, and beliefs toward breastfeeding play a critical role in her decision to start and continue breastfeeding. This study shows how the mother's views toward breastfeeding and her surroundings fit within the theory of planned behavior and the ecological levels of analysis.

Theory of Planned Behavior. Ajzen's theory of planned behavior explains a mother's decision to start and continue breastfeeding. Consistent with the model and previous research (Bertino et al., 2012; Moore & Coty, 2006), this study shows that mothers' positive beliefs toward breastfeeding translate into positive attitudes leading to the intention and decision to breastfeed. This is evidenced by mothers' responses that they *knew* they would breastfeed along with their strong agreement on statements that breastfeeding increases mother-infant bonding, babies fed breast milk are healthier, and breast milk is the ideal food for babies.

Many participants reported that support from their own mother, spouse, and friends along with successful breastfeeding of previous children was important in their decision to start and continue breastfeeding. Normative beliefs represent a mother's expectations regarding breastfeeding behavior of an important reference group. Mothers in this study considered their own mothers, spouses, and friends to be part of their reference group. This study's findings illustrate that approval from her own mother and/or spouse determines a mother's subjective norm toward breastfeeding leading to initiation and duration of breastfeeding. This finding is consistent with previous research that found that subjective norms were determinants of initiation and duration (Swanson & Power, 2005). In particular, these authors reported that mothers who continued breastfeeding perceived their spouses as

more pro-breastfeeding at six weeks. Future research should be directed toward following up with a mother's reference group to assess how supportive this group is in her efforts to continue breastfeeding.

Though mothers' attitudes and subjective norms are important antecedents to breastfeeding intention and behavior, this study emphasizes the influence of perceived behavioral control. Perceived behavioral control represents a mother's belief that she has the skills, ability, resources, and opportunity to engage in breastfeeding. The goal of all breastfeeding programs is to improve breastfeeding rates through patient education, staff education, professional support, peer support, and distribution of breastfeeding equipment. By educating mothers on the skills to breastfeed successfully and by providing her with breastfeeding equipment, the likelihood that the mother is able to breastfeed is high. An initiation rate of more than 95 percent and duration beyond one month demonstrate that these efforts were consistent with the model.

Ecological Levels of Analysis. Based on Bronfenbrenner's levels of analysis, the breastfeeding mother is embedded within different systems. It is important that she receives support from individuals within these systems. Within the proximal system, this study demonstrates that spousal support and support from her own mother are significant in a mother's decision to start and continue breastfeeding and that caring for other children may not be helpful in her effort to continue breastfeeding. Within the distal system, this study shows that the services provided by a breastfeeding support program or hospital are helpful when deciding to breastfeed.

Specifically, this study shows that actions at the locality or macro level reverberate throughout the whole system and affect the breastfeeding mother. Program services that

participants reported using frequently were the support from a breastfeeding educator, educational materials, and breastfeeding resources (e.g., equipment). At the locality level, unavailability of these services hampers efforts to promote breastfeeding rates. For example, a breastfeeding mother in a remote, rural area may need parts for her breastfeeding pump or she may encounter problems with breastfeeding and needs to consult with a lactation specialist. Or, an employer needs breastfeeding equipment for one of their employees. In these instances, a local health department may be able to meet their needs. It seems likely that breastfeeding mothers in rural areas may be at a greater disadvantage to start and continue breastfeeding when their health department no longer provides breastfeeding services.

Moreover, women in this study reported that hospitals were their main provider of breastfeeding services and so hospitals serve a critical role in how likely a mother is to start and continue breastfeeding. At the macro level, with the implementation of federal health care legislation and its preventive orientation toward wellness of mother and child, hospitals are in a great position to implement programs that advocate breastfeeding over bottle-feeding. Also, cultural heritage plays a key role in breastfeeding behavior (CDC, 2013) though this could not be confirmed with this study's findings. Furthermore, it appears that continued funding to sustain current breastfeeding programs is critical. Funding may be provided by foundations and federal, state, or local government. Cuts at any level would likely negatively affect the breastfeeding mother who uses breastfeeding services provided by agencies dependent on these funding sources.

Social Determinants as a Contributing Factor to Breastfeeding

Previous research demonstrates the impact of socio-economic factors on breastfeeding rates (Dubois & Girard, 2003; Flacking, Nyqvist, & Ewald, 2007; Kambale, 2011; Scott & Bins, 1999). Women who are older, more educated, and earn higher wages are more likely to start and continue breastfeeding. On one hand, this study's results confirm these findings. The demographic composition of the intervention and comparison groups varied along age, level of education, WIC status, and household income. Participants in the intervention group were generally younger, less educated, received WIC benefits, and earned less than $50,000 dollars per year as opposed to participants in the comparison group. Consistent with prior research, demographic factors may explain why participants in the intervention group breastfed for a shorter period of time though one needs to keep in mind that they were still breastfeeding at the time of data collection, which would affect breastfeeding duration positively.

Initiation and duration of breastfeeding also depend on race with Caucasian and Hispanic women more likely to start and continue breastfeeding than non-Hispanic and African American women (CDC, 2013). This study's outcome cannot confirm these findings and further research in this area may be needed particularly as it pertains to breastfeeding women of diverse racial backgrounds in rural areas.

Another factor to breastfeeding initiation and duration points to household composition. Previous studies show that spousal support contributes to higher breastfeeding rates (Arora, McJunkin, Wehrer, & Kuhn, 2000; Scott, Landers, Hughes, & Binns, 2001; Wolfberg, Michels, Shields, O'Campo, Bronner, & Bienstock, 2004). Most participants indicated that they had a spouse or partner, which may explain high initiation and continued

breastfeeding rates beyond one month. Additionally, taking time out to breastfeed an infant becomes challenging when there are older siblings in the household. Mothers in the intervention group cared for an average of two children over the age of six. Considering this fact in addition to their socio-economic status, the odds of increasing breastfeeding duration are against them even though they were still breastfeeding at the time of survey completion.

On the other hand, this study's findings also differ from studies reporting the impact of socio-economic factors on breastfeeding rates (Dubois & Girard, 2003; Flacking, Nyqvist, & Ewald, 2007; Kambale, 2011; Scott & Bins, 1999). Given the outcomes of these studies, it follows that participants in the intervention group should initiate breastfeeding less due to differences in demographic characteristics. In this study however, all participants started breastfeeding at nearly equal rates. Keeping in mind that this study consists of volunteer study participants and their potential interest in breastfeeding, it may still be reasonable to assume that the services provided by breastfeeding support programs may have influenced mothers in the intervention group to start breastfeeding.

It is important to note that most participants in this study reside in rural counties across Kansas. Access and availability of health care services continue to pose challenges for those living in rural areas (Anderson, 2012; Engelman, Perpich, Peterson, Hall, Ellerbeck, & Stanton, 2005; Enriquez, Moormeier, & Lafferty, 2012; Freeman, Ferrer, & Greiner, 2007; Ross, 2013). Intervention group participants may have been in higher need of breastfeeding support services than those in the comparison group especially considering their socio-economic status. Nevertheless, all women in this study initiated and continued breastfeeding at above the national average. It appears likely that Caucasian women in rural areas may be in just as much need of health care services as women from diverse racial

backgrounds, which is often the focus of research in rural areas (Blewett, Casey, & Thiede Call, 2004; Engelman, Cupertino, Daley, Long, Cully, Mayo, Ellerbeck, Geana, & Greiner, 2011).

Breastfeeding Practices as a Contributing Factor to Breastfeeding

Breastfeeding Practices Related to Initiation. All participants initiated breastfeeding at a rate of more than 95 percent, which exceeds the national breastfeeding initiation rate of 76.9 percent and the Kansas rate of 80.2 percent (CDC, 2012). In addition, nationally, low-income mothers (measured as participants in WIC) initiate breastfeeding at a rate of 66.1 percent versus 82.2 percent for higher income mothers (ineligible for WIC) (CDC, 2010). At the state level, low-income mothers in Kansas initiate breastfeeding at a rate of 68.4 percent (U.S. Department of Agriculture, 2011). Again, keeping in mind the selection factor, more than 50 percent of participants in the intervention group received WIC benefits and the fact that nearly all mothers in this group decided to start breastfeeding is a finding worth mentioning.

Participants reported using the support services of a breastfeeding educator more frequently than the other offered services. Additionally, most of the initial services were provided through the hospital and local public health department. Regardless of the provider of services, this finding is important as it enforces the notion that breastfeeding support educators are most likely the key to the success of breastfeeding support programs. Finally, support from immediate family including a mother's own mother and her spouse as well as breastfeeding history with previous children is instrumental in a mother's decision to start breastfeeding.

Breastfeeding Practices Related to Duration. The American Academy of Pediatrics (2012) and other organizations recommend exclusive breastfeeding for the first six months of an infant's life. Exclusive breastfeeding is defined as an infant receiving no other nutrition than breast milk (CDC, 2013). Even though mothers in this study did not exclusively breastfeed for six months, their infant still received breast milk as a primary source of nutrition for the first month and beyond. This is an important finding especially considering the difference in demographic composition of each group.

Additionally, participants varied in their decision to continue breastfeeding. Aside from the influence of socio-economic status and volunteer selection, a mother's decision to continue breastfeeding depends on a number of factors as explored in this study. Results from the first regression analysis suggest that the timing of introduction to other liquids and solid foods, maternal age, level of education, and household income significantly contribute to length of breastfeeding. This is particularly true when looking at the correlation between the timing of introducing other liquids and solids with the duration of breastfeeding ($r = .70$, $p < .001$, $\beta = .45$ and $r = .67$, $p < .001$, $\beta = .30$ respectively); the longer the delay in introducing food other than breast milk, the longer the duration of breastfeeding with the introduction of other liquids the most important.

The American Academy of Pediatrics (2012) recommends introducing liquids other than breast milk and solids at about six months of age. With the outcome of this study, it appears that introducing other liquids and solids tend to decrease the length of breastfeeding. As mothers in the intervention group introduced other liquids and solids when their infant was about two and a half months old, it follows that their potential to continue breastfeeding for a longer period of time is decreased.

This finding may be used as a point of reference in breastfeeding support programs. Most breastfeeding interventions focus on professional education of staff, pre- and/or post-natal education classes, support from a breastfeeding educator or lactation specialist, support from peers, and availability of breastfeeding equipment. A strategy that focuses on efforts to delay a mother's decision to introduce other liquids and solids to her infant may be another way to improve length of breastfeeding.

Results from the second regression analysis suggest that types of breastfeeding services also affect a mother's decision to continue breastfeeding. Again, this is particularly true when looking at the correlation between educational materials and peer support with length of breastfeeding (r = -.47, p < .001, β = -.45 and r = .37, p = .04, β = .22 respectively). It appears that educational materials distributed to mothers at their doctor's office work against duration of breastfeeding whereas peer support works to improve the length of breastfeeding. This finding serves to underscore the significance of peer support in relation to breastfeeding duration. Breastfeeding interventions may emphasize this program component when trying to improve the length of breastfeeding. Further research is needed to examine the effect of educational materials distributed at doctor's offices on length of breastfeeding.

Utilization/Provider of Breastfeeding Services. Participants reported that they used the services of a breastfeeding support educator frequently followed by use of educational materials and breastfeeding resources (e.g., breastfeeding pumps). As most breastfeeding support originates with hospitals, it is critical that they are strong advocates of breastfeeding. However, several mothers reported that the breastfeeding services they received from the hospital were not helpful in their decision to breastfeed.

Within the hospital setting, support should be provided not just by those having frequent contact with mothers (e.g., nurses, lactation specialists) but also by obstetricians, pediatricians, and primary care physicians. Specifically, hospitals need to focus on working with and encouraging mothers to breastfeed by, for example, limiting the distribution of pacifiers which are reported to reduce the duration of breastfeeding (Dewey, Nommsen-Rivers, Heinig, & Cohen, 2003) and increasing the distribution of breastfeeding support bags rather than formula support bags (CDC, 2008, 2011). It may also be helpful for hospitals to increase support to breastfeeding mothers after hospital discharge (CDC, 2011). Trying to avoid any practices that interfere with breastfeeding initiation and duration should be high on a hospital's agenda. Breastfeeding rates may improve when striving toward best practices in maternity care, which is acknowledged through international recognition of being designated a "Baby-Friendly" hospital (Baby-Friendly USA, 2013).

Breastfeeding programs discussed in this study are designed and administered by local health departments in primarily rural areas. Access and availability of health care services in these areas may be difficult (Freeman, Ferrer, & Greiner, 2007; Ross, 2013). Thus, another implication of this study stresses the importance of a collaborative partnership with the local hospital to optimize success of breastfeeding support programs. Failure of these programs is imminent when a local hospital is not cooperative in efforts to improve breastfeeding rates.

Mothers' Views of Breastfeeding as a Contributing Factor to Breastfeeding

Consistent with previous research findings, most participants thought that the nutritional and health benefits for their infant were most important in their decision to start breastfeeding (Chezem, 2012; Stuebe & Bonuck, 2011). Similarly, mothers' beliefs and

attitudes toward breastfeeding were highly positive contributing to their intention to breastfeed (Bertino et al., 2012; Moore & Coty, 2006). When asked what service was most valuable to them in their decision to start and continue breastfeeding, participants provided a wealth of information to open ended questions.

In their decision to *start* breastfeeding, all participants reported that the services of a breastfeeding support educator were highly valuable followed by educational materials and education classes. Additional comments to this survey item focused on five themes: individual perception of breastfeeding, familial and peer support, previous experience with breastfeeding, guidance from health care professionals, and breastfeeding resources. Research findings demonstrate that familial/peer support and guidance from health care professionals are particularly critical as they greatly influence a mother's decision to breastfeed her infant (Ceriani Cernadas, Noceda, Barrera, Martinez, & Garsd, 2003; Grassley & Eschiti, 2008; Meedya, Fahy, & Kable, 2010). It appears likely that non-supportive environments are not conducive to initiate and continue breastfeeding and this should be taken into account when designing breastfeeding interventions. As research findings indicate, special attention devoted to incorporating the mother's family as part of a breastfeeding intervention may assist in improving initiation and duration rates. Also, as most breastfeeding services are provided by hospitals, it can be speculated that the place of birth may have an effect on breastfeeding initiation and duration. Including the anticipated place of birth (e.g. hospital, birthing center) in breastfeeding programs may be another way to improve initiation and duration rates.

In their decision to *continue* breastfeeding, all participants valued the services of a breastfeeding support educator followed by peer support and educational materials. It

appears that the role of the breastfeeding educator is critical in providing support to breastfeeding mothers as respondents also identified this to be valuable in their decision to start breastfeeding. Further comments to this survey item focused on the same themes described earlier, but availability of breastfeeding equipment and employer support of breastfeeding were additional themes. Breastfeeding equipment such as a breastfeeding pump was very well received, which was consistent with previous research findings (Jacobson, Wetta, & Kurlekar, 2012). Comments on employer support were mostly negative, and employers were seen as a barrier to successful continuation of breastfeeding.

Mothers' Perceived Barriers in Relation to Breastfeeding

As more than 95 percent of participants started breastfeeding, it is difficult to assess if the baby's length of stay in the hospital hindered initiation though it is possible that longer stays, particularly when associated with a complication, negatively influence a mother's decision to start breastfeeding (Ayton, Hansen, Quinn, & Nelson, 2012; Dall'Oglio, Salvatori, Bonci, Nantini, D'Agostino, & Dotta, 2007). As most research findings focused on infants born prematurely and how this impacts breastfeeding, further research is needed with infants who are not pre-term but who do have an extended hospital stay beyond the usual 24 to 48 hours and why the stay was extended.

Another concern that surfaced among mothers was the perception that they did not produce adequate milk or that breast milk alone was not satisfying their infant. This perception is largely based on myths surrounding breastfeeding (Marques, Cotta, & Priore, 2011; Moxley & Kennedy, 1994). Additionally, mothers' feeding experiences with previous children influenced their choice of how to feed their current infant. Mothers who successfully breastfed other children were more likely to breastfeed their current infant

whereas those who successfully bottle-fed in the past were more likely to bottle-feed. Based on these findings, it is suggested for breastfeeding interventions to address mothers' perceptions and assure them that breast milk alone is an adequate source of nutrition as well as to incorporate mothers' previous feeding experiences.

There were several comments related to having multiple births and breastfeeding being stressful especially when mothers return to work. This finding suggests that interventions may think of incorporating a component that deals with the stresses of multiple births. Also, in this study, a couple of breastfeeding programs distributed breastfeeding equipment to employers to accommodate breastfeeding mothers who return to work. Based on participants' comments, interventions may need to focus more on following up and working with employers to make their environment more conducive to breastfeeding.

Finally, some professions are more stressful than others. For example, health care professionals who breastfeed their children need to receive support within their own organizations, which several participants reported they did not. Further research may be needed into examining how supportive employment settings are in providing a breastfeeding-friendly environment for their employees. It is simply not enough to distribute breastfeeding equipment when employers are not flexible in allowing their employees to pump breast milk or fail to provide them with a private space other than a bathroom or a multi-purpose room!

Public Health Policy

Currently, federal and state laws provide some protection for breastfeeding mothers. This study demonstrates that breastfeeding interventions make a difference particularly among low-income women residing in rural Kansas who need these services the most. A

Kansas policy targeted toward increasing breastfeeding rates in rural communities may be helpful such as promoting collaborative relationships among regional hospitals and public health departments.

Additionally, on-going funding appears to be a matter of high concern in order to sustain the efforts currently underway. Even though most states continue to struggle with budgetary constraints, it is difficult to understand from a public health perspective why states cannot provide matching funds.

Another implication of this study's findings for public policy in Kansas points to the ability of scientific researchers to obtain parental phone numbers and permission to contact parents. Due to current interpretation of two Kansas statutes, researchers are prohibited to contact parents directly and this has significantly affected the outcome of this study.

Limitations and Future Directions

Threats to internal validity refer to the way the data were collected. Data for the intervention group were collected over a time period of twelve months starting one year prior to data collection for the comparison group. Data for the comparison group were collected over a time period of five months. This may lead to maturation effects where processes within and outside of the participants change as a function of time.

Also, the survey was administered via the telephone for the intervention group versus via the internet for the comparison group again making the groups even less comparable. Self-selection was another significant threat to internal validity as this may have led to differential selection of participants. Additionally, volunteer selection of participants, a low response rate and small sample size somewhat limit this study's generalizability.

Further research is needed to assess the specific impact of program components on breastfeeding initiation and duration. Specifically, with this study, follow-up observational studies and/or the use of focus groups may assist in finding out what breastfeeding mothers need and want in their efforts to continue breastfeeding. Future efforts also need to focus on advocacy to address barriers in conducting research

Conclusion

Despite its limitations, this study shows that there are several variables that affect breastfeeding rates. Socio-economic status plays a key role in a woman's decision to start and continue breastfeeding. Consistent with previous research findings (Dubois & Girard, 2003; Flacking, Nyqvist, & Ewald, 2007; Kambale, 2011; Scott & Binns, 1999), this study shows that women who are older, more educated, and earn higher wages are more likely to breastfeed. Further, most women in this study lived in rural areas where access and availability of health care services is difficult at best (Anderson, 2012; Engelman, Perpich, Peterson, Hall, Ellerbeck, & Stanton, 2005; Enriquez, Moormeier, & Lafferty, 2012; Freeman, Ferrer, & Greiner, 2007; Ross, 2013).

It may be concluded that women who are of lower socio-economic status and who live in rural areas are less likely to breastfeed than women of higher socio-economic status living in more urban areas. Nevertheless, considering these obstacles as well as this study's volunteer selection factor, the women who volunteered to participate in this study initiated breastfeeding at above the national average and continued breastfeeding beyond one month.

The main factors that influence continuation of breastfeeding include maternal age, level of education, household income, and introduction of other liquids and solid foods. In particular, this study found that the longer the delay in introducing food other than breast

milk, the longer the duration of breastfeeding with the introduction of other liquids more influential than the introduction of solid foods. It also appears that the educational materials distributed to mothers at their doctor's office work against length of breastfeeding and peer support works to improve it.

Additionally, the women in this study reported that the services of a breastfeeding support educator greatly influenced their decision to start and continue breastfeeding. In fact, mothers not only used this service frequently, but also indicated that they valued this service the most. Mothers also valued the use of educational materials and education classes in their decision to start breastfeeding and use of peer support and educational materials in their efforts to continue breastfeeding. Other services that mothers reported using frequently were breastfeeding resources such as the breastfeeding pump.

Furthermore, this study demonstrates the importance and influence of context within which a breastfeeding mother resides. Sources of breastfeeding support include immediate family, spouse, own mother, close friends, places of work, hospitals, public health departments, health care professionals, and various laws. Support of one's own mother, spouse, and employer is particularly important in women's efforts to continue breastfeeding. Resistance to breastfeeding by any of these parties influences a mother's decision to start and continue breastfeeding.

In summary, breastfeeding support programs appear to make a difference among those who need and use their services. Based on this study's findings, it appears that breastfeeding interventions may be more helpful for low-income women in rural areas of Kansas. This study's outcome has implications for breastfeeding interventions that are administered by the fifteen participating public health departments. From an ecological

systems perspective that embeds the breastfeeding mother within multiple spheres of influence, the following recommendations can be incorporated into breastfeeding interventions to enhance program services and delivery:

- Focus on services provided by the breastfeeding support educator.
- Adopt a strategy to delay the introduction of other liquids and solid foods.
- Focus on establishing peer support groups.
- Incorporate mothers' social network when providing breastfeeding services.
- Focus on collaboration with local hospital when providing services.
- Incorporate an educational component into the program that focuses on women's perceptions of breastfeeding and feeding patterns with previous children.
- Focus on strategies to reduce stress due to care for other siblings, multiple births, etc.
- Work and follow-up with employers in establishing an environment conducive for breastfeeding.

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APPENDIX

APPENDIX

Breastfeeding Initiative
Evaluation Survey

An Evaluation on the Effectiveness of Breastfeeding Interventions through Exploration of Mothers' Attitudes, Knowledge, and Beliefs toward Breastfeeding; Perceived Barriers to Breastfeeding; and Current Breastfeeding Practices

I. Introduction

Good morning/good afternoon, on your return letter to us, you indicated that you may be interested in participating in our survey through the University of Kansas School of Medicine, Wichita. Would now be a good time to answer a few questions? *(wait for respondent's answer)*.

My name is Lisette Jacobson and I am a researcher with the University of Kansas School of Medicine. The telephone survey will take about 10 minutes of your time and I will record your answer to each question. You are asked to participate in this survey because of the recent birth of your baby. The Kansas Department of Health and Environment provided us with names of mothers who have recently given birth. Your name was randomly selected to be in this study.

You may be using breastfeeding support services provided through your local Health department or other organizations. With this survey, we are interested in understanding your opinions about breastfeeding. We would also like to provide you with an opportunity to give us feedback regarding the services you may have received on breastfeeding.

We want to assure you that your participation in this study will in no way affect the services you are currently receiving or will receive in the future. There are absolutely no adverse effects if you decide not to participate. Also, please remember that there is no right or wrong answer. I would ask you to be honest with your responses as this will provide us with feedback on how we can help you in the future.

Your participation in this study is completely voluntary. You do not have to answer any questions that make you feel uncomfortable. You may quit at any time. If you have any questions, suggestions, concerns, or complaints, you may contact Dr. Wetta-Hall by phone, (316)293-2627, or email, Rwettaha@kumc.edu. Thank you very much for your time and participation.

II. Demographics – Part I

1. Do you participate in your local Health department's breastfeeding support program?

□ No
□ Yes

2. In what city/county are you located?

[BOX] /[BOX]
City County

III. Baby's Length of Stay

3. When was your baby born?

[BOX] /[BOX] /20___[BOX]
Month Day Year

4. After your baby was born, how long did he or she stay in the hospital?

□ Less than 24 hours (less than 1 day)
□ 24 to 48 hours (1 to 2 days)
□ 3 to 5 days
□ 6 to 14 days
□ More than 14 days
□ My baby was not born in a hospital
□ My baby is still in the hospital

IV. Breastfeeding

5. Did you ever breastfeed or pump breast milk to feed your new baby after delivery?

□ No = Go to Question 12
□ Yes

6. During *your most recent* pregnancy, what did you think about breastfeeding your new baby? Check one answer.

- □ I knew I would breastfeed
- □ I thought I might breastfeed
- □ I knew I would ***not*** breastfeed
- □ I didn't know what to do about breastfeeding

7. Why did you decide to breastfeed or pump breast milk to feed your new baby? Check one answer.

- □ Because of the nutritional and health benefits to my baby
- □ Because breastfeeding is not as expensive as using baby formula
- □ Because it is easier to breastfeed my baby than to use formula
- □ Because breastfeeding helps me bond with my baby
- □ Other → Please tell us: **[BOX]**

8. Are you still currently breastfeeding or feeding pumped milk to your new baby?

- □ No
- □ Yes = Go to Question 10

9. What were your reasons for stopping breastfeeding? Check all that apply.

- □ My baby had difficulty latching or nursing
- □ Breast milk alone did not satisfy my baby
- □ I thought my baby was not gaining enough weight
- □ My nipples were sore, cracked, or bleeding
- □ It was too hard, painful, or too time consuming
- □ I thought I was not producing enough milk
- □ I had too many other household duties
- □ I felt it was the right time to stop breastfeeding
- □ I got sick and was not able to breastfeed
- □ I went back to work or school
- □ My baby was jaundiced (yellowing of the skin or whites of the eyes)
- □ Other → Please tell us: **[BOX]**

10. How many weeks or months do/did you breastfeed or pump milk to feed your baby?

[BOX] Weeks **OR [BOX]** Months

11. How old was your new baby the first time he or she drank liquids other than breast milk (such as formula, water, juice, tea, or cow's milk)?

[BOX] Weeks **OR [BOX]** Months

□ My baby was less than 1 week old
□ My baby has not had any liquids other than breast milk

12. How old was your new baby the first time he or she ate food (such as baby cereal, baby food or any other food)?

[BOX] Weeks **OR [BOX]** Months

□ My baby was less than 1 week old
□ My baby has not eaten any foods

13. Why did you decide not to breastfeed your new baby?

Please tell us: _____

_____

14. For each of the following statements, please indicate how much you agree or disagree (1 = *strong disagreement* [SD], 2 = *disagreement* [D], 3 = *neutral* [N], 4 = *agreement* [A], 5 = *strong agreement* [SA])

	SD	**D**	**N**	**A**	**SA**
Breast-feeding increases mother-infant bonding.	1	2	3	4	5
Babies fed breast milk are healthier than babies who are fed formula.	1	2	3	4	5
Breast milk is the ideal food for babies.	1	2	3	4	5

15. At your workplace or school, what happens when a mother wants to breastfeed? Check <u>all</u> that apply.

□ She can keep her baby and the baby can breastfeed as needed
□ She can use break time to breastfeed the baby
□ She can use break time to pump milk
□ It is hard to use breaks or find a place to pump or breastfeed
□ She is not allowed to breastfeed the baby at work or school
□ I don't know
□ Other → Please tell us: **[BOX]**

V. Program Impact

16. After your baby's birth, did you receive any follow-up services to support you with breastfeeding within 10 days after birth?

- □ No
- □ Yes
- □ Don't know

17. Which of the following breastfeeding support services do/did you use? Check all that apply.

- □ I received educational materials on breastfeeding from my doctor's office
- □ I am attending/have attended an educational class to support me with breastfeeding
- □ I received support from a breastfeeding support educator
- □ I am attending/have attended a breastfeeding peer support group
- □ I received breastfeeding resources (i.e. support bag, breast pump)
- □ My employer provides me with a designated room equipped to breastfeed my baby or to express breast milk
- □ Other → Please tell us: **[BOX]**

18. Who provided the breastfeeding service? Check all that apply.

- □ Hospital
- □ Family physician or pediatrician
- □ County health department (includes Healthy Start Home Visitor program)
- □ La Leche League
- □ A breastfeeding support clinic – If yes, go to Question 19
- □ A breastfeeding support educator – If yes, go to Question 20
- □ Other → Please tell us: **[BOX]**

19. If you visited a Breastfeeding Support Clinic, what service was most valuable to you? Check one answer.

- □ I did not visit a Breastfeeding Support Clinic
- □ Infant weight checks
- □ Breastfeeding support services
- □ Breastfeeding support group
- □ Other→ Please tell us: **[BOX]**

20. If you received breastfeeding support from a breastfeeding support educator, did she contact you *before* or *after* the birth of your baby or at both times?

- □ I did not receive support from a breastfeeding support educator
- □ Before birth of my baby
- □ After birth of my baby
- □ Both before and after the birth of my baby

21. Does your employer have a breastfeeding support program in place?

- □ No = Go to Question 25
- □ Yes
- □ Don't know

22. What does your employer offer for breastfeeding moms? Check all that apply.

- □ A designated, private room solely for moms to breastfeed or express milk
- □ A commercial grade breast pump
- □ A rocking chair/ottoman
- □ A refrigerator
- □ Other → Please tell us: **[BOX]**

23. Do you think your employer is supportive of breastfeeding or expressing milk while at work?

- □ Strongly agree
- □ Agree
- □ Don't know
- □ Disagree
- □ Strongly disagree

24. What do you think your employer can do to improve the current breastfeeding support service they have in place? Check all that apply.

- □ Nothing, I am satisfied with my employer's current breastfeeding service
- □ Allow more time to breastfeed or express milk
- □ Allow more privacy when breastfeeding or expressing milk
- □ Get better breastfeeding equipment such as **[specify]**
- □ Other → Please tell us: **[BOX]**

25. Of the following services, what service is/was the most valuable to you in terms of your decision to *start* breastfeeding? Check one answer.

- □ Educational materials
- □ Educational classes
- □ Breastfeeding support educator
- □ Breastfeeding peer support group
- □ Follow-up service within 10 days of my baby's birth
- □ Breastfeeding support bag
- □ Breastfeeding equipment
- □ Breastfeeding support clinic
- □ My employer's policy on breastfeeding
- □ Other → Please tell us: **[BOX]**
- □ Did not breastfeed

26. Of the following services, what service is/was the <u>most</u> valuable to you in terms of your decision to *<u>continue</u>*** breastfeeding?** Check <u>one</u> answer.

- □ Educational materials
- □ Educational classes
- □ Breastfeeding support educator
- □ Breastfeeding peer support group
- □ Follow-up service within 10 days of my baby's birth
- □ Breastfeeding support bag
- □ Breastfeeding equipment
- □ Breastfeeding support clinic
- □ My employer's policy on breastfeeding
- □ Other → Please tell us: **[BOX]**
- □ Did not breastfeed

VI. Demographics – Part II

27. What is your ethnicity/race?

- □ Caucasian/White
- □ African American/Black
- □ Hispanic/Latino
- □ American Indian/Alaskan Native
- □ Asian
- □ Native Hawaiian/Pacific Islander
- □ Multi-racial
- □ Other: **[BOX]**

28. What age group are you in?

- □ Less than 18 years of age
- □ Between 18 and 25
- □ Between 26 and 35
- □ Between 36 and 45
- □ Between 46 and 55
- □ Over 55 years of age

29. Who lives in the same house with you *now*? Check all that apply.

- □ My husband or partner
- □ Children aged less than 12 months ☐ How many children? **[BOX]**
- □ Children aged 1 year to 5 years ☐ How many children? **[BOX]**
- □ Children aged 6 years and over ☐ How many children? **[BOX]**
- □ I live alone
- □ Other → Please tell us: **[BOX]**

30. What is the highest level of education you have completed? Check one answer.

- □ Some high school
- □ Graduated from high school
- □ Vocational, trade, or technical school
- □ Junior or community college
- □ 4 Year college degree
- □ Advanced degree (e.g., Masters, PhD, MD)
- □ Other
- □ Not sure

31. During *your most recent* pregnancy, were you on WIC (the Special Supplemental Nutrition Program for Women, Infants, and Children)?

- □ No
- □ Yes

32. During the *12 months before* your new baby was born, what was your yearly total household income before taxes? Include your income, your husband's or partner's income, and any other income you may have received. (All information will be kept private and will not affect any services you are now getting.)

- □ Less than $24,999
- □ $25,000 to $49,999
- □ $50,000 to $74,999
- □ $75,000 or more